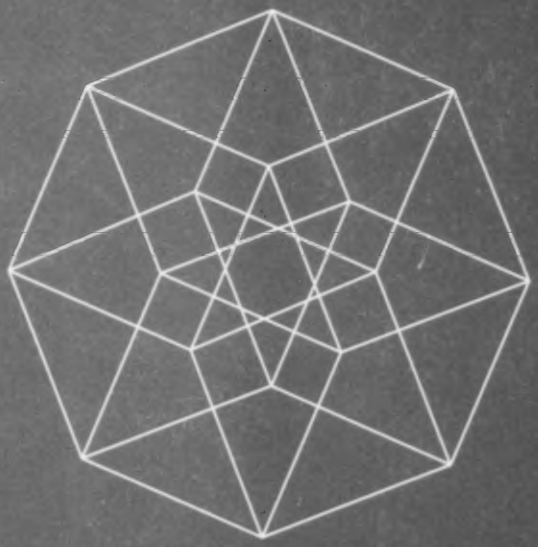
ISSN 0166-218X

DISCRETE APPLIED MATHEMATICS



MASTER INDEX
VOLUMES 91–100
(Book announcements)

COMBINATORIAL
ALGORITHMS
OPTIMIZATION AND
COMPUTER SCIENCE

NOW included in your subscription
ELECTRONIC ACCESS
www.elsevier.nl/locate/elecacc

NORTH-HOLLAND

Abstracted/Indexed in:
ACM Computing Reviews
Cambridge Scientific Abstracts
Current Contents: Physical, Chemical & Earth Sciences
Engineering Index/Compendex
INSPEC Information Services
International Abstracts in Operations Research
Mathematical Reviews
PASCAL
Science Citation Index
Statistical Theory and Method Abstracts
Zentralblatt für Mathematik
Anbar Electronic Intelligence

EDITOR-IN-CHIEF Peter L. Hammer, Piscataway (NJ)

ADVISORY EDITORS

E. Balas, Pittsburgh (PA)
C. Berge, Paris
G.B. Dantzig, Stanford (CA)
P.C. Fishburn, Florham Park (NJ)
T. Ibaraki, Kyoto
V.L. Klee, Seattle (WA)
D.J. Kleitman, Cambridge (MA)
B. Korte, Bonn
B. Trakhtenbrot, Ramat Aviv

BOARD OF EDITORS

N. Alon, Ramat Aviv
D. Avis, Montreal (Que.)
C. Benzaken, Grenoble
J.-C. Bermond, Sophia Antipolis
K.P. Bogart, Hanover (NH)
E. Boros, Piscataway (NJ)
R.E. Burkard, Graz
V. Chvátal, Piscataway (NJ)
D.G. Corneil, Toronto (Ont.)
D. de Werra, Lausanne
S. Fujishige, Osaka
F. Giannessi, Pisa
M.C. Golumbic, Ramat Gan
R.L. Graham, La Jolla (CA)
P. Hansen, Montréal (Qué.)
F. Harary, Las Cruces (NM)
P. Hell, Burnaby (B.C.)
A.J. Hoffman, Yorktown Heights (NY)
S. Istrail, Albuquerque (NM)
M. Iri, Tokyo
S. Istrail, Albuquerque (NM)
G. Kalai, Jerusalem
R.M. Karp, Berkeley (CA)
J. Krarup, Copenhagen
T. Lengauer, St. Augustin
M. Lomonosov, Beer Sheva
L. Lovász, Redmond (WA)
F. Maffioli, Milano
C. McDiarmid, Oxford
N. Megiddo, San Jose (CA)
R.H. Möhring, Berlin
P. Pevzner, Los Angeles (CA)
G.L. Nemhauser, Atlanta (GA)
H. Noltemeier, Würzburg
P. Pevzner, Los Angeles (CA)
A. Prekopa, New Brunswick (NJ)
R.C. Read, Waterloo (Ont.)
F.S. Roberts, Piscataway (NJ)
M. Saks, Piscataway (NJ)
A. Salomaa, Turku
A. Schrijver, Amsterdam
M. Segal, Holmdel (NJ)
R. Shamir, Tel Aviv
Z. Wan, Beijing

EDITORS MATHEMATICAL SOFTWARE SECTION
P. Toth, Bologna
S. Martello, Bologna

EDITORIAL MANAGER Nelly Segal, New Brunswick (NJ)

Scope of the Journal

The aim of this journal is to bring together research papers in different areas of algorithmic and applicable discrete mathematics, as well as applications of combinatorial mathematics to computer science, OR and various areas of science and technology.
Contributions presented to the journal can be research papers, short notes, surveys, and possibly research problems. The "Communications" section will be devoted to the fastest possible publication of the brief outlines of recent research results, the detailed presentation of which might be submitted for possible publication in DAM or elsewhere. The journal will also publish a limited number of book announcements, as well as proceedings of conferences.

⊙ The paper used in this publication meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper)

Printed in The Netherlands

DISCRETE APPLIED MATHEMATICS

DISCRETE APPLIED MATHEMATICS

MASTER INDEX
VOLUMES 91–100

ELSEVIER

Amsterdam – Lausanne – New York – Oxford – Shannon – Tokyo

© 2000 Elsevier Science B.V. All rights reserved.

This journal and the individual contributions contained in it are protected under copyright by Elsevier Science B.V., and the following terms and conditions apply to their use:

Photocopying

Single photocopies of single articles may be made for personal use as allowed by national copyright laws. Permission of the publisher and payment of a fee is required for all other photocopying, including multiple or systematic copying, copying for advertising or promotional purposes, resale, and all forms of document delivery. Special rates are available for educational institutions that wish to make photocopies for non-profit educational classroom use.

Permissions may be sought directly from Elsevier Science Rights & Permissions Department, P.O. Box 800, Oxford OX5 1DX, UK; phone: (+44) 1865 843830, fax: (+44) 1865 853333, e-mail: permissions@elsevier.co.uk. You may also contact Rights & Permissions directly through Elsevier's home page (http://www.elsevier.nl), selecting first 'Customer Support', then 'General Information', then 'Permissions Query Form'.

In the USA, users may clear permissions and make payments through the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, MA 01923, USA; phone: (+1)(978) 7508400, fax: (+1)(978) 7504744, and in the UK through the Copyright Licensing Agency Rapid Clearance Service (CLARCS), 90 Tottenham Court Road, London W1P 0LP, UK; phone: (+44)171 631 5555; fax: (+44) 171 631 5500. Other countries may have a local reprographic rights agency for payments.

Derivative Works

Subscribers may reproduce tables of contents or prepare lists of articles including abstracts for internal circulation within their institutions. Permission of the publisher is required for resale or distribution outside the institution.

Permission of the publisher is required for all other derivative works, including compilations and translations.

Electronic Storage or Usage

Permission of the Publisher is required to store or use electronically any material contained in this journal, including any article or part of an article. Contact the publisher at the address indicated.

Except as outlined above no part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without prior written permission of the Publisher.

Address permissions requests to: Elsevier Science Rights & Permissions Department, at the mail, fax and e-mail addresses noted above.

Notice

No responsibility is assumed by the Publisher for any injury and/or damage to persons or property as a matter of products liability, negligence or otherwise, or from any use or operation of any methods, products, instructions or ideas contained in the material herein. Because of rapid advances in the medical sciences, in particular, independent verification of diagnoses and drug dosages should be made.

Although all advertising material is expected to conform to ethical (medical) standards, inclusion in this publication does not constitute a guarantee or endorsement of the quality or value of such product or of the claims made of it by its manufacturer.

Editor-in-Chief

P.L. Hammer, RUTCOR, Rutgers, the State University of New Jersey, 640 Bartholomew Road, Piscataway, NJ 08854-8003, USA

Advisory Editors

E. Balas, Carnegie-Mellon University, Graduate School of Industrial Administration, Schenley Park, Pittsburgh, PA 15213, USA
C. Berge, E.R. Combinatoire, Centre de Mathématique Sociale, 54 Boulevard Raspail, 75270 Paris Cedex 06, France
G.B. Dantzig, Stanford University, Department of Operations Research, Terman Engineering Center, Stanford, CA 94305, USA
P.C. Fishburn, AT&T Labs - Research, 180 Park Avenue, Florham Park, NJ 07932-0971, USA
T. Ibaraki, Kyoto University, Faculty of Engineering, Department of Applied Mathematics & Physics, Kyoto 606, Japan
V.L. Klee, University of Washington, Department of Mathematics, Seattle, WA 98195, USA
D.J. Kleitman, Massachusetts Institute of Technology, Department of Mathematics, Cambridge, MA 02139, USA
B. Korte, Universität Bonn, Abteilung Operations Research, Nassestrasse 2, D-5300 Bonn 1, Germany
B. Trakhtenbrot, Tel Aviv University, Department of Computer Science, 69978 Ramat Aviv, Tel Aviv, Israel

Board of Editors

N. Alon, Tel Aviv University, Department of Mathematics, Ramat Aviv, 69978 Tel Aviv, Israel
D. Avis, McGill University, School of Computer Science, 3480 University, Montreal, Quebec H3A 2A7, Canada
C. Benzaken, Laboratoire Leibniz, IMAG, 46 av. Felix Viallet, F-38031 Grenoble Cedex 1, France
J.-C. Bermond, Laboratoire I3S-CNRS, Université de Nice-Sophia Antipolis, Laboratoire 13S-CNRS, Bât ESSI-BP 145, 930 Route des Colles, F-06903 Sophia-Antipolis Cedex, France
K.P. Bogart, Dartmouth College, Department of Mathematics, 6188 Bradley Hall, Hanover, NH 03755, USA
E. Boros, RUTCOR, the State University of New Jersey, 640 Bartholomew Road, Piscataway, NJ 08854-8003, USA
R.E. Burkard, Technische Universität Graz, Institut für Mathematik, Steyrergasse 30, A-8010 Graz, Austria
V. Chvatal, Rutgers, the State University of New Jersey, Department of Computer Science, Hill Center, Piscataway, NJ 08854-8003, USA
D.G. Corneil, University of Toronto, Department of Computer Science, Toronto, Ontario, M5S 1A4, Canada
D. de Werra, École Polytechnique Fédérale de Lausanne, Departement de Mathématiques, MA Ecublens, Lausanne, CH-1015, Switzerland
S. Fujishige, Division of Systems Science, Graduate School of Engineering Science, Osaka University, Toyonaka, Osaka 560-8531, Japan
F. Giannessi, Universita di Pisa, Dipartimento di Matematica, Via Buonarroti 2, I-156100 Pisa, Italy
M.C. Golumbic, Bar-Ilan University, Department of Mathematics and Computer Science, Ramat Gan, Israel
R.L. Graham, University of California – San Diego, CSE APM, La Jolla, CA 92093-0114, USA
P. Hansen, GERAD-HEC, École Polytechnique Montréal, 5255 Ave. Decelles, Montréal, Quebec H3T 1V6, Canada

F. Harary, New Mexico State University, Department of Computer Science, Box 30001, Las Cruces, NM 88003-8001, USA
P. Hell, Simon Fraser University, Department of Computer Science, Burnaby, British Columbia, V5A 1S6, Canada
A.J. Hoffman, IBM Thomas Watson Research Center, Mathematical Sciences Department, P.O. Box 218, Yorktown Heights, NY 10598, USA
S. Istrail, Sandia National Laboratories, Algorithms and Discrete Mathematics Department, 1423, Albuquerque, NM 97185, USA
M. Iri, Chuo University, Department of Information & System Engineering, 1-13-27 Kasuga, Bunkyo-Ku, Tokyo 112, Japan
G. Kalai, The Hebrew University, Department of Mathematics, Givat Ram, Jerusalem 91904, Israel
R.M. Karp, University of California, Computer Science Division, MC 1776, Berkeley, CA 94720-1776, USA
J. Krarup, University of Copenhagen, Department of Computer Science, Universitetsparken 1, DK-2100 Copenhagen O, Denmark
T. Lengauer, GMD-SCAI, Schloss Birlinghoven, D-53754 Sankt. Augustin, Germany
M. Lomonosov, Ben Gurion University of the Negev, Department of Mathematics & Computer Science, P.O. Box 653, Beer Sheva 84105, Israel
L. Lovász, Microsoft Research, One Microsoft Way, Redmond, WA 98052, USA
F. Maffioli, Politecnico di Milano, Dipartimento di Elettronica, Piazza Leonardo da Vinci 32, I-20133 Milano, Italy
C. McDiarmid, University of Oxford, Department of Statistics, 1 South Parks Road, Oxford OX1 3TG, UK
N. Megiddo, IBM Almaden Research Center, 650 Harry Road, San Jose, CA 95120-6099, USA
R.H. Möhring, Technische Universität Berlin, Fachbereich Mathematik (MA 6-1), Strasse des 17 Juni 136, D-10623 Berlin, Germany
G.L. Nemhauser, Georgia Institute of Technology, School of Industrial & Systems Engineering, Atlanta, GA 30332-0205, USA
G.L. Noltemeier, Universität Würzburg, Institut für Informatik I, Am Hubland, D-97074 Würzburg, Germany
P. Pevzner, University of Southern California, Department of Mathematics, DRB 155, 1042 W. 36th Place, Los Angeles, CA 90089-1113, USA
A. Prekopa, Rutgers, the State University of New Jersey, RUTCOR, 640 Bartholomew Road, Piscataway, NJ 08854-8003, USA
R.C. Read, University of Waterloo, Department of Combinatorics and Optimization, Waterloo, Ontatio, N2L 3G1, Canada
F.S. Roberts, Rutgers, the State University of New Jersey, Department of Mathematics, Hill Center, Piscataway, NJ 08855, USA
M. Saks, Rutgers, the State Univesity of New Jersey, Department of Mathematics, Hill Center, Piscataway, NJ 0855, USA
A. Salomaa, University of Turku, Academy of Finland and Math. Dept., FI-20500 Turku 50, Finland
A. Schrijver, CWI, P.O. Box 94079, Kruislaan 413, 1090 GB Amsterdam, The Netherlands
M. Segal, AT&T Bell Laboratories, 101 Crawfords Corner Road, Holmdel, NJ 07733, USA
R. Shamir, Tel Aviv University, School of Mathematics, Tel Aviv 69978, Israel
Z. Wan, Academia Sinica, Institute of Systems Science, Beijing 100080, China

Editors Mathematical Software Section

S. Martello, DEIS Universita di Bologna, Viale Risogimento 2, 40136, Bologna, Italy
P. Toth, DEIS, Universita di Bologna, Viale Risogimento 2, 40136, Bologna, Italy

ELSEVIER

DISCRETE
APPLIED
MATHEMATICS

List of Referees: Volumes 91–100

DISCRETE APPLIED MATHEMATICS has continuously benefitted from the kind assistance of a great number of referees. We hereby express our gratitude for their sustained efforts, without which our activity could not have been carried out.

The Editors

A.A. Ageev
F. Aguilo-Gost
R. Ahlswede
A. Ainouche
S.G. Akl
V.B. Alekseev
F. Alizadeh
J-P. Allouche
N. Alon
I. Anderson
K. Ando
T. Andreae
J. Appleget
K.T. Arasu
D. Archdeacon
Asano, Tetsuo
D. Avis

L. Babel
D. Babic
M. Bakonyi
A.T. Balaban
J. Bang-Jensen
A. Bar-Noy
L.M. Batten
F.B. Baulieu
L.W. Beineke
F.E. Bennett
A. Berry
J. Berstel
D. Betten
S. Bezrukov
T. Biedl
C. Blundo
Bo Chen
H.L. Bodlaender
E. Boros
U. Brandes
A. Brandstadt
S. Brandt
M.F. Bridgland
G. Brinkmann
H.J. Broersma
R.A. Brualdi
P. Brucker
A.M. Bruckstein
R.E. Burkard
M.L. Bushnell
P. Butkovic

N. Cai
C.S. Calude
K. Cameron
E.R. Canfield
J. Carlier
K. Cechlarova
E. Cela
S. Ceria
V. Chandru
CHANG Gerard J
G. Chartrand
V.D. Chepoi
S. Chopra
P. Chretienne
M. Chrobak
E.G. Coffmann
C.J. Colbourn
G. Cornuejols
K. Culik II

E. Dahlhaus
P. Damaschke
D. de Werra
V. Deineko
M. Dell'Amico
C. Delorme
M. Dessouky
J. Diatta
J.H. Dinitz
F.F. Dragan
S. Droste
Du Ding-Zhu
P. Duchet
D. Dunham
R.A. Dwyer

E. Einy
T. Eiter

M.H. El-Zahar
K. Engel
P.L. Erdos
T. Etzion
R. Euler
H. Everett

FAN Genghua
R.J. Faudree
U. Feige
S. Felsner
W. Fernandez de la Vega
B. Fichet
N.J. Finizio
G. Finke
M. Fischetti
P.C. Fishburn
P. Flocchini
S. Foldes
F. Fomin
B. Fortz
P.W. Fowler
A.S. Fraenkel
P. Fraigniaud
J.V. Franco
A. Frank
R. Freund
J. Friedman
S. Fujishige
S. Fujita
K. Fukuda

J. Galambos
G. Gallo
B. Ganter
N. Garg
L. Gargano
W.I. Gasarch
M. Gavalec
F. Gavril
F. Gecseg
W.V. Gehrlein
B. Gerards
S.N.T. Gerke
F. Glover
F. Gobel
M.K. Goldberg
M.C. Golumbic
K. Gopalakrishnan
M. Goresky
R.L. Graham
J.R. Griggs
H-D. Gronau
H. Gropp
L.K. Grover
S. Guha
D.R. Guichard
V.A. Gurvich
G.Z. Gutin
A. Gyarfas

M. Habib
G. Hahn
S.L. Hakimi
H.W. Hamacher
M. Hanazawa
HAO Jin-Kao
H. Harborth
L.H. Harper
P. Hell
L.. Hellerstein
Y.T. Herer
A. Hertz
C. Heuberger
C.T. Hoang
W. Hochstaettler
T. Hoholdt
R. Holzman
J. Honkala
J.A. Hoogeveen
R. Horst
S. Hougardy
T.C. Hu
C. Huafei Yan
F. Hurtado
T. Ibaraki
R.W. Irving
G. Isaak

K. Jansen
J.C.M. Janssen
T. Jordan
H.A. Jung
M. Junger
D. Jungnickel
H. Jurgensen

K.G. Kakoulis
B. Kalyanasundaram
P. Kaminsky
G. Karolyi
L. Kaszonyi
H. Kellerer
D. Kelly
W. Kern
A.E. Kezdy
L.H. Khachatrian
S. Khuller
KIM Jeong Han
L. Kirousis
A. Klapper
R. Klimmek
W. Knoedel
D. Kobler
M. Kochol
E. Koehler
A. Kogan
M. Kolonko
E. Korach
G. Korchmaros
A.V. Kostochka
E. Kranakis
J. Kratochvil
D. Kratsch
D.L. Kreher
J.W. Krussel
W. Kubiak
O. Kullmann

J. Labelle
G. Lancia
L.J. Langley
G. Laporte
LE Van Bang
I. Leader
D.T. Lee
J. Lehel
J.M.Y. Leung
J.Y-T. Leung
LI Xueliang
A.L. Liestman
C.C. Lindner
S.L.S. Lins
V.A. Liskovets
LIU Yanpei
T.J. Lowe
B.D. Lubachevsky
G.S. Lueker
J.R. Lundgren

F. Maffray
N.V.R. Mahadev
K. Makino
J. Malkevitch
J. Manuch
I. Maros
R. Mathon
P. Mathonet
T. Mautor
C. McDiarmid
F.R. McMorris
K. Meer
N. Megiddo
K. Metsch
C. Meyer
W.H. Mills
M. Minoux
R.H. Moehring
M. Molloy
C.L. Monma
J.W. Moon
H. Morita
M. Morvan
M. Moscarini
H. Mueller
H.M. Mulder
R.C. Mullin
A. Munier
K. Murota

H. Nagamochi
A. Nakayama
D. Naor
H. Narayanan
J.J. Noga
H. Noltemeier
M. Noy
Z. Nutov

S. Olariu
J.B. Orlin
P.R.J. Ostergard
S. Ovchinnikov

J. Pach
M. Padberg
D. Paulusma
G. Paun
U.N. Peled
D. Peleg
M. Penn
Y. Peres
C. Peyrat
K.T. Phelps
T. Pisanski
J. Plesnik
A. Pluhar
R.C. Powers
A. Prekopa
D. Pretolani
C. Prins
H.J. Proemel
J.S. Provan

D.J. Rader, Jr.
S.P. Radziszowski
R.L. Rardin
V.J. Rayward-Smith
R.C. Read
A. Recski
F. Rendl
K. Reuter
C.C. Ribeiro
R. Rizzi
D. Roelants
A. Rosa
D. Rotem
U.G. Rothblum
C. Roucairol
C.C. Rousseau
R. Rudolf
F. Ruskey
I. Rusu

H. Sachs
A. Sali Jr.
A. Salomaa
D. Sankoff
A.A. Sapozhenko
M.W.P. Savelsbergh
P. Scheffler
P. Schellenberg
R.H. Schelp
I. Schiermeyer
A.S. Schulz
P.C. Schuur
S. Seiden
S.M. Selkow
K. Seyffarth
B.L. Shader
Y.M. Shafransky
J. Sheehan
D. Simovici
J. Siran
J. Six
N.J.A. Sloane
V. Soltan
M. Soss
D. Sotteau

E. Speckenmeyer
F.C.R. Spieksma
J. Spinrad
A.P. Sprague
A. Srinivasan
D.R. Stinson
A.P. Street
V.A. Strusevich
M. Sudan
R.A. Sulanke
SUN Xiaorong
L.A. Szekely

J. Terno
A. Thayse
C. Thomassen
G.L. Thompson
M. Thorup
TIAN Feng
G. Tinhofer
V.D. Tonchev
G.T. Toussaint
C.A. Tovey
L. Trevisan
M.A. Trick
E. Triesch
N. Trinajstic
W.T. Trotter
A. Tucker
G. Turan
Z. Tuza

R. Uzsoy

J. van den Heuvel
A. Van Gelder
G.H.J. van Rees
A. van Wijngaarden
M. Veldhorst
J.A. Ventura
A. Vince
B. Vizvari
V.I. Voloshin
T. Vovor

T. Walsh
H. Walther
WAN Pengjun
WANG Hong
WANG Jianfang
WANG Yi
D. Warme
W.D. Weakley
I. Wegener
D.B. West
A.T. White
D. Williamson
S.J. Willson
G.J. Woeginger
L.A. Wolsey
D.R. Woodall
WU Wei-Li

YAN Guiying
H.P. Yap
N. Young
YU Shyr-Shen
M. Yvinec

J. Zaks
A.Z. Zelikovsky
ZHANG Cun-Quan
ZHU Lie
G.M. Ziegler
K. Zimmermann
J.S. Zito
I.E. Zverovich
V.E. Zverovich
W. Zwicker

ELSEVIER

DISCRETE
APPLIED
MATHEMATICS

Master Index: Volumes 91–100

Abbas, N. and L. Stewart, Clustering bipartite and chordal graphs: Complexity, sequential and parallel algorithms 91 (1999) 1– 23

Abellanas, M., J. Garcia, G. Hernández, M. Noy and P. Ramos, Bipartite embeddings of trees in the plane 93 (1999) 141–148

Ageev, A.A. and M.I. Sviridenko, An 0.828-approximation algorithm for the uncapacitated facility location problem 93 (1999) 149–156

Ahlswede, R. and Z. Zhang, On maximal shadows of members in left-compressed sets 95 (1999) 3– 9

Alexopoulos, C., J.S. Provan, H.D. Ratliff and B.R. Stutzman, Minimal connected enclosures on an embedded planar graph 91 (1999) 25– 38

Alon, N. and S. Onn, Separable partitions 91 (1999) 39– 51

An, C., see F. Zhang 98 (2000) 165–171

Angel, E. and V. Zissimopoulos, On the classification of NP-complete problems in terms of their correlation coefficient 99 (2000) 261–277

Anthony, M., Accuracy of techniques for the logical analysis of data 96/97 (1999) 247–257

Arbib, C., D. Pacciarelli and S. Smriglio, A three-dimensional matching model for perishable production scheduling 92 (1999) 1– 15

Arbib, C., M. Flammini and E. Nardelli, How to survive while visiting a graph 99 (2000) 279–293

Arthanari, T.S. and M. Usha, An alternate formulation of the symmetric traveling salesman problem and its properties 98 (2000) 173–190

Babel, L. and S. Olariu, On the p-connectedness of graphs – a survey 95 (1999) 11– 33

Babel, L., A. Brandstädt and V.B. Le, Recognizing the P_4-structure of bipartite graphs 93 (1999) 157–168

Babel, L., Recognition and isomorphism of tree-like P_4-connected graphs 99 (2000) 295–315

Bang-Jensen, J. and G. Gutin, On the complexity of hamiltonian path and cycle problems in certain classes of digraphs 95 (1999) 41– 60

Bang-Jensen, J., Y. Guo and A. Yeo, A new sufficient condition for a digraph to be Hamiltonian 95 (1999) 61– 72

Bar-Noy, A., S. Kipnis and B. Schieber, Optimal multiple message broadcasting in telephone-like communication systems 100 (2000) 1– 15

Barré, V. and J.-L. Fouquet, On minimal imperfect graphs without induced P_5 94 (1999) 9– 33
Battiti, R. and M. Protasi, Reactive local search techniques for the maximum k-conjunctive constraint satisfaction problem (*MAX-k-CCSP*) 96/97 (1999) 3– 27
Bauer, D., G.Y. Katona, D. Kratsch and H.J. Veldman, Chordality and 2-factors in tough graphs 99 (2000) 323–329
Bauer, D., H.J. Broersma and H.J. Veldman, Not every 2-tough graph is Hamiltonian 99 (2000) 317–321
Bennett, F.E., A brief survey of perfect Mendelsohn packing and covering designs 95 (1999) 73– 81
Benzaken, C., From logical gates synthesis to chromatic bicritical clutters 96/97 (1999) 259–305
Betten, A. and D. Betten, The proper linear spaces on 17 points 95 (1999) 83–108
Betten, A., G. Brinkmann and T. Pisanski, Counting symmetric configurations v_3 99 (2000) 331–338
Betten, A., R. Laue and A. Wassermann, Simple 8-(40,11,1440) designs 95 (1999) 109–114
Betten, D., see A. Betten 95 (1999) 83–108
Bey, C., The Erdös-Ko-Rado bound for the function lattice 95 (1999) 115–125
Bezrukov, S.L., R. Elsässer and U.-P. Schroeder, On k-partitioning of Hamming graphs 95 (1999) 127–140
Bioch, J.C., T. Ibaraki and K. Makino, Minimum self-dual decompositions of positive dual-minor Boolean functions 96/97 (1999) 307–326
Blazewicz, J., A. Hertz, D. Kobler and D. de Werra, On some properties of DNA graphs 98 (2000) 1– 19
Błażewicz, J., M. Drozdowski, F. Guinand and D. Trystram, Scheduling a divisible task in a two-dimensional toroidal mesh 94 (1999) 35– 50
Büning, H.K. and T. Lettmann, Resolution remains hard under equivalence 96/97 (1999) 139–148
Bo, Z. and B. Liu, Matrices with maximum exponents in the class of doubly stochastic primitive matrices 91 (1999) 53– 66
Bockmayr, A., F. Eisenbrand, M. Hartmann and A.S. Schulz, On the Chvátal rank of polytopes in the 0/1 cube 98 (2000) 21– 27
Boliac, R., D. Lozovanu and D. Solomon, Optimal paths in network games with p players 99 (2000) 339–348
Borie, R.B. and J.P. Spinrad, Construction of a simple elimination scheme for a chordal comparability graph in linear time (*Note*) 91 (1999) 287–292
Boros, E., Maximum renamable Horn sub-CNFs 96/97 (1999) 29– 40
Boufflet, J.P. and J. Carlier, An exact method for minimizing the makespan of an application processed on a master slave bus oriented multiprocessor system 94 (1999) 51– 76

Bär, G., On the Complexity of Linear Programming in the BSS-model 95 (1999) 35– 40
Brandes, U., W. Schlickenrieder, G. Neyer, D. Wagner and K. Weihe, A software package of algorithms and heuristics for disjoint paths in *Pla*nar *Net*works 92 (1999) 91–110
Brandstädt, A. and P.L. Hammer, On the stability number of claw-free P_5-free and more general graphs 95 (1999) 163–167
Brandstädt, A. and V.B. Le, Recognizing the P_4-structure of block graphs 99 (2000) 349–366
Brandstädt, A. and V.B. Le, Tree- and forest-perfect graphs 95 (1999) 141–162
Brandstädt, A., see L. Babel 93 (1999) 157–168
Branković, L., see P. Horak 91 (1999) 119–126
Brinkmann, G., see A. Betten 99 (2000) 331–338
Broersma, H.J., E. Dahlhaus and T. Kloks, A linear time algorithm for minimum fill-in and treewidth for distance hereditary graphs 99 (2000) 367–400
Broersma, H.J., see D. Bauer 99 (2000) 317–321
Brucker, P., T. Hilbig and J.Hurink, A branch and bound algorithm for a single-machine scheduling problem with positive and negative time-lags 94 (1999) 77– 99

Canfield, E.R. and K. Engel, An upper bound for the size of the largest antichain in the poset of partitions of an integer 95 (1999) 169–180
Caprara, A. and J.J.S. González, Separating lifted odd-hole inequalities to solve the index selection problem 92 (1999) 111–134
Carlier, J., see J.P. Boufflet 94 (1999) 51– 76
Carstens, H.G., T. Dinski and E. Steffen, Reduction of symmetric configurations n_3 99 (2000) 401–411
Chang, G.J. and X. Zhu, Pseudo-Hamiltonian-connected graphs 100 (2000) 145–153
Chang, S.Y. and H.-C. Hwang, The worst-case analysis of the MULTIFIT algorithm for scheduling nonsimultaneous parallel machines 92 (1999) 135–147
Chekuri, C. and R. Motwani, Precedence constrained scheduling to minimize sum of weighted completion times on a single machine 98 (2000) 29– 38
Cherifi, R., S. Gravier, X. Lagraula, C. Payan and I. Zighem, Domination number of the cross product of paths 94 (1999) 101–139
Chiu, S.Y., L.A. Cox Jr. and X. Sun, Optimal sequential inspections of reliability systems subject to parallel-chain precedence constraints 96/97 (1999) 327–336
Chrétienne, P., List schedules for cyclic scheduling 94 (1999) 141–159

Cicerone, S. and G.D. Stefano, Graph classes between parity and distance-hereditary graphs 95 (1999) 197–216
Cicerone, S. and G.D. Stefano, On the extension of bipartite to parity graphs 95 (1999) 181–195
Cieslik, D., The Steiner ratio of $\mathscr{L}_{2k}^{d}$ 95 (1999) 217–221
Corneil, D.G., see M.-C Li 98 (2000) 219–225
Cox, L.A. Jr., see S.Y. Chiu 96/97 (1999) 327–336
Creignou, N. and H. Daude, Satisfiability threshold for random XOR-CNF formulas 96/97 (1999) 41– 53

Dahlhaus, E., see H.J. Broersma 99 (2000) 367–400
Damanik, D., Local symmetries in the period-doubling sequence 100 (2000) 115–121
Dassow, J. and G. Păun, On the regularity of languages generated by context-free evolutionary grammars 92 (1999) 205–209
Daude, H., see N. Creignou 96/97 (1999) 41– 53
de Figueiredo, C.M.H., Gimbel, C.P. Mello and J.L. Szwarcfiter, Even and odd pairs in comparability and in P_4-comparability graphs (*Note*) 91 (1999) 293–297
De Simone, C. and J. Körner, On the odd cycles of normal graphs 94 (1999) 161–169
de Werra, D., Ch. Eisenbeis, S. Lelait and B. Marmol, On a graph-theoretical model for cyclic register allocation 93 (1999) 191–203
de Werra, D., On a multiconstrained model for chromatic scheduling 94 (1999) 171–180
de Werra, D., see J. Blazewicz 98 (2000) 1– 19
Dell'Amico, M. and P. Toth, Algorithms and codes for dense assignment problems: the state of the art 100 (2000) 17– 48
Dell'Olmo, P. and M.G. Speranza, Approximation algorithms for partitioning small items in unequal bins to minimize the total size 94 (1999) 181–191
Deĭneko, V.G. and G.J. Woeginger, The Maximum Travelling Salesman Problem on symmetric Demidenko matrices 99 (2000) 413–425
Deogun, J.S., T. Kloks, D. Kratsch and H. Müller, On the vertex ranking problem for trapezoid, circular-arc and other graphs 98 (2000) 39– 63
Dinneen, M.J., J.A. Ventura, M.C. Wilson and G. Zakeri, Compound constructions of broadcast networks 93 (1999) 205–232
Dinski, T., see H.G. Carstens 99 (2000) 401–411
Downey, R.G., M.R. Fellows and V. Raman, The complexity of irredundant sets parameterized by size 100 (2000) 155–167
Dragan , F.F., Strongly orderable graphs A common generalization of strongly chordal and chordal bipartite graphs 99 (2000) 427–442

Dragan, F.F. and F. Nicolai, LexBFS-orderings of distance-hereditary graphs with application to the diametral pair problem 98 (2000) 191–207
Dragan, F.F., Almost diameter of a house-hole-free graph in linear time via LexBFS 95 (1999) 223–239
Drozdowski, M., see J. Błażewicz 94 (1999) 35– 50
Déséerable, D., A family of Cayley graphs on the hexavalent grid 93 (1999) 169–189

Ehrgott, M., H.W. Hamacher and S. Nickel, Geometric methods to solve max-ordering location problems 93 (1999) 3– 20
Eisenbeis, Ch., see D. de Werra 93 (1999) 191–203
Eisenbrand, F., see A. Bockmayr 98 (2000) 21– 27
Eiter, T., T. Ibaraki and K. Makino, Bidual Horn functions and extensions 96/97 (1999) 55– 88
Ekin, O., P.L. Hammer and A. Kogan, On connected Boolean functions 96/97 (1999) 337–362
Elsässer, R., see S.L. Bezrukov 95 (1999) 127–140
Emiris, I.Z. and J. Verschelde, How to count efficiently all affine roots of a polynomial system 93 (1999) 21– 32
Engel, K., see E.R. Canfield 95 (1999) 169–180
Enomoto, H., M.S. Miyauchi and K. Ota, Lower bounds for the number of edge-crossings over the spine in a topological book embedding of a graph 92 (1999) 149–155
Everett, H., F. Hurtado and M. Noy, Stabbing information of a simple polygon 91 (1999) 67– 82

Farin, G., see L. Gross 93 (1999) 33– 50
Fellows, M.R., see R.G. Downey 100 (2000) 155–167
Fischer, P., N. Klasner and I. Wegener, On the cut-off point for combinatorial group testing 91 (1999) 83– 92
Flammini, M., see C. Arbib 99 (2000) 279–293
Fomin, F.V., Note on a helicopter search problem on graphs 95 (1999) 241–249
Fouquet, J.-L., see V. Barré 94 (1999) 9– 33
Franco, J., J. Goldsmith, J. Schlipf, E. Speckenmeyer and R.P. Swaminathan, An algorithm for the class of pure implicational formulas 96/97 (1999) 89–106
Friedl, K. and S.-C. Tsai, Two results on the bit extraction problem 99 (2000) 443–454
Fujishige, S. and S. Iwata, Minimizing a submodular function arising from a concave function 92 (1999) 211–215
Fujishige, S., A laminarity property of the polyhedron described by a weakly posi-modular set function 100 (2000) 123–126

Gambini, I., A method for cutting squares into distinct squares 98 (2000) 65– 80
García, J., see M. Abellanas 93 (1999) 141–148
Gavalec, M., Computing orbit period in max–min algebra 100 (2000) 49– 65
Göbel, F. and E.A. Neutel, Cyclic graphs 99 (2000) 3– 12
Giaro, K., M. Kubale and M. Małafiejski, On the deficiency of bipartite graphs 94 (1999) 193–203
Gimbel, J., see C.M.H. de Figueiredo 91 (1999) 293–297
Goerdt, A., A remark on random 2-SAT 96/97 (1999) 107–110
Goldsmith, J., see J. Franco 96/97 (1999) 89–106
Golin, M. and A. Schuster, Optimal point-to-point broadcast algorithms via lopsided trees 93 (1999) 233–263
González, J.J.S., see A. Caprara 92 (1999) 111–134
Granot, D., F. Granot and W.R. Zhu, Naturally submodular digraphs and forbidden digraph configurations 100 (2000) 67– 84
Granot, F., see D. Granot 100 (2000) 67– 84
Gravier, S., see R. Cherifi 94 (1999) 101–139
Gropp, H., On some infinite series of $(r,1)$-designs 99 (2000) 13– 21
Gross, L. and G. Farin, A transfinite form of Sibson's interpolant 93 (1999) 33– 50
Grüttmüller, M., On the PBD-closure of sets containing 3 95 (1999) 251–272
Gu, J., The *Multi-SAT* algorithm 96/97 (1999) 111–126
Gu, Q.-P. and H. Tamaki, Multicolor routing in the undirected hypercube 100 (2000) 169–181
Guinand, F., see J. Błażewicz 94 (1999) 35– 50
Guo, Y., Outpaths in semicomplete multipartite digraphs 95 (1999) 273–277
Guo, Y., see J. Bang-Jensen 95 (1999) 61– 72
Guo, Y., see T. Yao 99 (2000) 245–249
Guruswami, V. and C.P. Rangan, Algorithmic aspects of clique-transversal and clique-independent sets 100 (2000) 183–202
Guruswami, V., Maximum cut on line and total graphs 92 (1999) 217–221
Gurvich, V. and L. Khachiyan, On generating the irredundant conjunctive and disjunctive normal forms of monotone Boolean functions 96/97 (1999) 363–373
Gutin, G., see J. Bang-Jensen 95 (1999) 41– 60
Gvozdjak, P., P. Horák, M. Meszka and Z. Skupień, On the strong chromatic index of cyclic multigraphs 99 (2000) 23– 38

Halldórsson, M.M., J. Kratochvíl and J.A. Telle, Independent sets with domination constraints 99 (2000) 39– 54
Hamacher, A., W. Hochstättler and C. Moll, Tree partitioning under constraints — clustering for vehicle routing problems 99 (2000) 55– 69
Hamacher, H.W., see M. Ehrgott 93 (1999) 3– 20

Hambrusch, S.E. and H.-S. Lim, Minimizing broadcast costs under edge reductions in tree networks 91 (1999) 93–117
Hammer, P.L., see A. Brandstädt 95 (1999) 163–167
Hammer, P.L., see O. Ekin 96/97 (1999) 337–362
Hansen, P., B. Jaumard and C. Meyer, On lower bounds for numbered complete graphs 94 (1999) 205–225
Hansen, P., B. Jaumard and G.-B.D. Nguetse, Best second order bounds for two-terminal network reliability with dependent edge failures 96/97 (1999) 375–393
Harborth, H. and M. Möller, Weakened Ramsey numbers 95 (1999) 279–294
Harper, L.H., On an isoperimetric problem for Hamming graphs 95 (1999) 285–309
Hartmann, M., see A. Bockmayr 98 (2000) 21– 27
Hartmann, S., Asymptotic results on suborthogonal $\mathfrak{G}$-decompositions of complete digraphs 95 (1999) 311–320
Harutyunyan, H.A. and A.L. Liestman, More broadcast graphs 98 (2000) 81–102
He, Y., see C.-Y. Lee 100 (2000) 133–135
Hernando, M.C., F. Hurtado, A. Márquez, M. Mora and M. Noy, Geometric tree graphs of points in convex position 93 (1999) 51– 66
Hernández, G., see M. Abellanas 93 (1999) 141–148
Hertz, A., On perfect switching classes 94 (1999) 3– 7
Hertz, A., see J. Blazewicz 98 (2000) 1– 19
Heusch, P., The complexity of the falsifiability problem for pure implicational formulas 96/97 (1999) 127–138
Hilbig, T., see P. Brucker 94 (1999) 77– 99
Hilton, A.J.W. and P.D. Johnson Jr., The Hall number, the Hall index, and the total Hall number of a graph 94 (1999) 227–245
Hipke, C., C. Icking, R. Klein and E. Langetepe, How to find a point on a line within a fixed distance 93 (1999) 67– 73
Hoàng, C.T., On the disc-structure of perfect graphs I the co-paw-structure Claude Berge for his seventieth birthday 94 (1999) 247–262
Hochstättler, W., see A. Hamacher 99 (2000) 55– 69
Hoffmann, F., K. Kriegel and C. Wenk, An applied point pattern matching problem: comparing 2D patterns of protein spots 93 (1999) 75– 88
Honkala, J., On the equivalence problem of context-free and DT0L languages 98 (2000) 147–149
Hooker, J.N. and M.A. Osorio, Mixed logical linear programming 96/97 (1999) 395–442
Horak, P., L. Brankovič and M. Miller, A combinatorial problem in database security 91 (1999) 119–126
Horák, P., see P. Gvozdjak 99 (2000) 23– 38

Huck, A., Reducible configurations for the cycle double cover conjecture 99 (2000) 71- 90
Hurink, J., see P. Brucker 94 (1999) 77- 99
Hurtado, F., see H. Everett 91 (1999) 67- 82
Hurtado, F., see M.C. Hernando 93 (1999) 51- 66
Hwang, H.-C., see S.Y. Chang 92 (1999) 135-147

Ibaraki, T., see J.C. Bioch 96/97 (1999) 307-326
Ibaraki, T., see K. Makino 96/97 (1999) 443-460
Ibaraki, T., see T. Eiter 96/97 (1999) 55- 88
Icking, C., see C. Hipke 93 (1999) 67- 73
Imrich, W. and S. Klavžar, Recognizing graphs of acyclic cubical complexes 95 (1999) 321-330
Irving, R.W. and D.F. Manlove, The b-chromatic number of a graph 91 (1999) 127-141
Iwata, S., see S. Fujishige 92 (1999) 211-215

Jackson, J., E. Shamir and C. Shwartzman, Learning with queries corrupted by classification noise 92 (1999) 157-175
Jaumard, B., see P. Hansen 94 (1999) 205-225
Jaumard, B., see P. Hansen 96/97 (1999) 375-393
Johnson Jr., P.D., see A.J.W. Hilton 94 (1999) 227-245
Józefowska, J., M. Mika, R. Różycki, G. Waligóra and J. Węglarz, Discrete-continuous scheduling to minimize the makespan for power processing rates of jobs 94 (1999) 263-285
Jungnickel, D. and A. Pott, Perfect and almost perfect sequences 95 (1999) 331-359

Karch, O. and T. Wahl, Relocalization - theory and practice 93 (1999) 89-108
Katona, G.Y., see D. Bauer 99 (2000) 323-329
Khachiyan, L., see V. Gurvich 96/97 (1999) 363-373
Köhler, E., Connected domination and dominating clique in trapezoid graphs 99 (2000) 21-110
Khosrovshahi, G.B., H.R. Maimani and R. Torabi, On trades: an update 95 (1999) 361-376
Kim, H.K., see J. Lee 91 (1999) 299-303
Kipnis, S., see A. Bar-Noy 100 (2000) 1- 15
Klasner, N., see P. Fischer 91 (1999) 83- 92
Klavžar, S., see W. Imrich 95 (1999) 321-330
Klein, R., see C. Hipke 93 (1999) 67- 73
Kloks, T., see H.J. Broersma 99 (2000) 367-400
Kloks, T., see J.S. Deogun 98 (2000) 39- 63
Kobler, D., see J. Blazewicz 98 (2000) 1- 19

Kogan, A., see O. Ekin 96/97 (1999) 337–362
Koh, K.M. and E.G. Tay, On optimal orientations of cartesian products with a bipartite graph 98 (2000) 103–120
Köhler, E., Connected domination and dominating clique in trapezoid graphs 99 (2000) 91–110
Körner, J., see C. De Simone 94 (1999) 161–169
Kortsarz, G. and D. Peleg, Approximating the weight of shallow Steiner trees 93 (1999) 265–285
Kovacs, T. and A. Lingas, Maximum packing for biconnected outerplanar graphs 100 (2000) 85– 94
Kratochvíl, J., see M.M. Halldórsson 99 (2000) 39– 54
Kratsch, D., Domination and total domination on asteroidal triple-free graphs 99 (2000) 111–123
Kratsch, D., see D. Bauer 99 (2000) 323–329
Kratsch, D., see J.S. Deogun 98 (2000) 39– 63
Kravchenko, S.A., Minimizing the number of late jobs for the two-machine unit-time job-shop scheduling problem 98 (2000) 209–217
Kravchenko, S.A., On the complexity of minimizing the number of late jobs in unit time open shop 100 (2000) 127–132
Krüger, U., Structural aspects of ordered polymatroids 99 (2000) 125–148
Kriegel, K., see C. Hipke 93 (1999) 75–88
Kubale, M., see K. Giaro 94 (1999) 193–203
Kullmann, O., On a generalization of extended resolution 96/97 (1999) 149–176

Lagraula, X., see R. Cherifi 94 (1999) 101–139
Langetepe, E., see C. Hipke 93 (1999) 67– 73
Laue, R., see A. Betten 95 (1999) 109–114
Le, V.B., see A. Brandstädt 95 (1999) 141–162
Le, V.B., see A. Brandstädt 99 (2000) 349–366
Le, V.B., see L. Babel 93 (1999) 157–168
Leck, U. and V. Leck, Orthogonal double covers of complete graphs by trees of small diameter 95 (1999) 377–388
Leck, V., see U. Leck 95 (1999) 377–388
Lee, C.-Y., Y. He and G. Tang, A note on "parallel machine scheduling with non-simultaneous machine available time" 100 (2000) 133–135
Lee, J., M.Y. Sohn and H.K. Kim, A note on graphs with large girth and small minus domination number (*Note*) 91 (1999) 299–303
Lelait, S., see D. de Werra 93 (1999) 191–203
Lettmann, T., see H.K. Büning 96/97 (1999) 139–148
Li, H., see F. Zhang 92 (1999) 71– 84
Li, M.-C, D.G. Corneil and E. Mendelsohn, Pancyclicity and NP-completeness in planar graphs 98 (2000) 219–225
Liestman, A.L., see H.A. Harutyunyan 98 (2000) 81–102

Lim, H.-S., see S.E. Hambrusch 91 (1999) 93–117
Lingas, A., see T. Kovacs 100 (2000) 85– 94
Liu, B., see Z. Bo 91 (1999) 53–66
Lozovanu, D., see R. Boliac 99 (2000) 339–348

MacGillivray, G. and M.-L. Yu, Generalized partitions of graphs 91 (1999) 143–153
Maffray, F. and M. Preissmann, Sequential colorings and perfect graphs 94 (1999) 287–296
Mahjoub, A.R. and C. Nocq, On the linear relaxation of the 2-node connected subgraph polytope 95 (1999) 389–416
Maimani, H.R., see G.B. Khosrovshahi 95 (1999) 361–376
Makino, K. and T. Ibaraki, Inner-core and outer-core functions of partially defined Boolean functions 96/97 (1999) 443–460
Makino, K., see J.C. Bioch 96/97 (1999) 307–326
Makino, K., see T. Eiter 96/97 (1999) 55– 88
Małafiejski, M., see K. Giaro 94 (1999) 193–203
Manlove, D.F., On the algorithmic complexity of twelve covering and independence parameters of graphs 91 (1999) 155–175
Manlove, D.F., see R.W. Irving 91 (1999) 127–141
Marmol, B., see D. de Werra 93 (1999) 191–203
Márquez, A. see M.C. Hernando 93 (1999) 51– 66
Mazoyer, J. and I. Rapaport, Inducing an order on cellular automata by a grouping operation 91 (1999) 177–196
McDiarmid, C., Pattern minimisation in cutting stock problems 98 (2000) 121–130
Melissen, J.B.M. and P.C. Schuur, Covering a rectangle with six and seven circles 99 (2000) 149–156
Mello, C.P., see C.M.H. de Figueiredo 91 (1999) 293–297
Mendelsohn, E., see M.-C Li 98 (2000) 219–225
Mengersen, I. and J. Oeckermann, Matching-star Ramsey sets 95 (1999) 417–424
Merlini, D., D.G. Rogers, R. Sprugnoli and M.C. Verri, Underdiagonal lattice paths with unrestricted steps 91 (1999) 197–213
Meszka, M., see P. Gvozdjak 99 (2000) 23– 38
Meyer, C., see P. Hansen 94 (1999) 205–225
Mika, M., see J. Józefowska 94 (1999) 263–285
Miller, M., see P. Horak 91 (1999) 119–126
Miyakawa, M., A. Nozaki, G. Pogosyan and I.G. Rosenberg, A map from the lower-half of the n-cube onto the $(n-1)$-cube which preserves intersecting antichains 92 (1999) 223–228
Miyauchi, M.S., see H. Enomoto 92 (1999) 149–155
Müller, H., see J.S. Deogun 98 (2000) 39– 63
Möller, M., see H. Harborth 95 (1999) 279–294

Moeri, N., A technique to find multiple motif occurrences in a biomolecular sequence 94 (1999) 297–319
Moll, C., see A. Hamacher 99 (2000) 55– 69
Mora, M., see M.C. Hernando 93 (1999) 51– 66
Mosca, R., Stable sets in certain P_6-free graphs 92 (1999) 177–191
Motwani, R., see C. Chekuri 98 (2000) 29– 38
Moulton, V. and M. Steel, Retractions of finite distance functions onto tree metrics 91 (1999) 215–233

Naor, J., A. Orda and Y. Petruschka, Dynamic storage allocation with known durations 100 (2000) 203–213
Nardelli, E., see C. Arbib 99 (2000) 279–293
Neutel, E.A., see F. Göbel 99 (2000) 3– 12
Neyer, G., see U. Brandes 92 (1999) 91–110
Ng, M.P., M. Steel and N.C. Wormald, The difficulty of constructing a leaf-labelled tree including or avoiding given subtrees 98 (2000) 227–235
Nguetse, G.-B.D., see P. Hansen 96/97 (1999) 375–393
Nickel, S., see M. Ehrgott 93 (1999) 3– 20
Nicolai, F., see F.F. Dragan 98 (2000) 191–207
Nocq, C., see A.R. Mahjoub 95 (1999) 389–416
Noy, M., see H. Everett 91 (1999) 67– 82
Noy, M., see M. Abellanas 93 (1999) 141–148
Noy, M., see M.C. Hernando 93 (1999) 51– 66
Nozaki, A., see M. Miyakawa 92 (1999) 223–228
Nurmela, K.J. and P.R.J. Östergård, Covering t-sets with $(t + 2)$-sets 95 (1999) 425–437

Oeckermann, J., see I. Mengersen 95 (1999) 417–424
Olariu, S., see L. Babel 95 (1999) 11– 33
Onn, S., see N. Alon 91 (1999) 39– 51
Opatrny, J. and D. Sotteau, Embeddings of complete binary trees into grids and extended grids with total vertex-congestion 1 98 (2000) 237–254
Orda, A., see J. Naor 100 (2000) 203–213
Osorio, M.A., see J.N. Hooker 96/97 (1999) 395–442
Ota, K., see H. Enomoto 92 (1999) 149–155

Pacciarelli, D., see C. Arbib 92 (1999) 1– 15
Pardalos, P.M., see M.G. Resende 100 (2000) 95–113
Payan, C., see R. Cherifi 94 (1999) 101–139
Peart, P. and W.-j. Woan, A divisibility property for a subgroup of Riordan matrices 98 (2000) 255–263

Peleg, D., see G. Kortsarz 93 (1999) 265–285
Peter, M. and G. Wambach, N-extendible posets, and how to minimize total weighted completion time 99 (2000) 157–167
Petruschka, Y., see J. Naor 100 (2000) 203–213
Pisanski, T., see A. Betten 99 (2000) 331–338
Pitsoulis, L.S., see M.G. Resende 100 (2000) 95–113
Plesník, J., Constrained weighted matchings and edge coverings in graphs 92 (1999) 229–241
Pogosyan, G., see M. Miyakawa 92 (1999) 223–228
Pott, A., see D. Jungnickel 95 (1999) 331–359
Preissmann, M., see F. Maffray 94 (1999) 287–296
Prisner, E. and J.L. Szwarcfiter, Recognizing clique graphs of directed and rooted path graphs 94 (1999) 321–328
Prisner, E., Recognizing k-path graphs 99 (2000) 169–181
Protasi, M., see R. Battiti 96/97 (1999) 3–27
Provan, J.S., see C. Alexopoulos 91 (1999) 25–38
Păun, G., see J. Dassow 92 (1999) 205–209

Qi, X. and F. Tu, Earliness and tardiness scheduling problems on a batch processor 98 (2000) 131–145

Raffinot, M., Asymptotic estimation of the average number of terminal states in DAWGs 92 (1999) 193–203
Raman, V., see R.G. Downey 100 (2000) 155–167
Ramos, P., see M. Abellanas 93 (1999) 141–148
Rangan, C.P., see V. Guruswami 100 (2000) 183–202
Rapaport, I., see J. Mazoyer 91 (1999) 177–196
Raschle, T. and K. Simon, On the P_4-components of graphs 100 (2000) 215–235
Ratliff, H.D., see C. Alexopoulos 91 (1999) 25–38
Resende, M.G., L.S. Pitsoulis and P.M. Pardalos, Fortran subroutines for computing approximate solutions of weighted MAX-SAT problems using GRASP 100 (2000) 95–113
Richomme, G. and P. Séébold, Characterization of test-sets for overlap-free morphisms 98 (2000) 151–157
Righini, G. and M. Trubian, Data-dependent bounds for the General and the Asymmetric Stacker–Crane problems 91 (1999) 235–242
Rogers, D.G., see D. Merlini 91 (1999) 197–213
Rosenberg, I.G., see M. Miyakawa 92 (1999) 223–228
Różycki, R., see J. Józefowska 94 (1999) 263–285
Rusu, I., P_4-domination in minimal imperfect graphs 94 (1999) 329–336

Salazar, J.J., A note on the generalized steiner tree polytope 100 (2000) 137–144
Séébold, P., see G. Richomme 98 (2000) 151–157

Schöbel, A., Solving restricted line location problems via a dual interpretation 93 (1999) 109–125
Schieber, B., see A. Bar-Noy 100 (2000) 1– 15
Schlickenrieder, W., see U. Brandes 92 (1999) 91–110
Schlipf, J., see J. Franco 96/97 (1999) 89–106
Schroeder, U.-P., see S.L. Bezrukov 95 (1999) 127–140
Schulz, A.S., see A. Bockmayr 98 (2000) 21– 27
Schumacher, U., Suborthogonal double covers of the complete graph by stars 95 (1999) 439–444
Schuster, A., see M. Golin 93 (1999) 233–263
Schuur, P.C., see J.B.M. Melissen 99 (2000) 149–156
Sebö, A. and Z. Waksman, Optimal binary trees with order constraints (*Note*) 91 (1999) 305–311
Shamir, E., see J. Jackson 92 (1999) 157–175
Shwartzman, C., see J. Jackson 92 (1999) 157–175
Simon, K., see T. Raschle 100 (2000) 215–235
Sitters, R.A., A short proof of a conjecture on the T_r-choice number of even cycles 92 (1999) 243–246
Skupień, Z., see P. Gvozdjak 99 (2000) 23– 38
Smriglio, S., see C. Arbib 92 (1999) 1– 15
Sohn, M.Y., see J. Lee 91 (1999) 299–303
Sojka, E., A new algorithm for Jordan sorting: its average-case analysis 93 (1999) 127–140
Solomon, D., see R. Boliac 99 (2000) 339–348
Sotteau, D., see J. Opatrny 98 (2000) 237–254
Speckenmeyer, E., see J. Franco 96/97 (1999) 89–106
Speranza, M.G., see P. Dell'Olmo 94 (1999) 181–191
Spinard, J.P., see R.B. Borie 91 (1999) 287–292
Sprugnoli, R., see D. Merlini 91 (1999) 197–213
Srivastav, A. and P. Stangier, On complexity, representation and approximation of integral multicommodity flows 99 (2000) 183–208
Stallaert, J., Valid inequalities and separation for capacitated fixed charge flow problems 98 (2000) 265–274
Stangier, P., see A. Srivastav 99 (2000) 183–208
Steel, M., see M.P. Ng 98 (2000) 227–235
Steel, M., see V. Moulton 91 (1999) 215–233
Stefano, G.D., see S. Cicerone 95 (1999) 181–195
Stefano, G.D., see S. Cicerone 95 (1999) 197–216
Steffen, E., see H.G. Carstens 99 (2000) 401–411
Östergård, P.R.J., see K.J. Nurmela 95 (1999) 425–437
Stewart, L., see N. Abbas 91 (1999) 1– 23
Strusevich, V.A., A heuristic for the two-machine open-shop scheduling problem with transportation times 93 (1999) 287–304

Stutzman, B.R., see C. Alexopoulos 91 (1999) 25– 38
Sugita, K., see K. Uemura 91 (1999) 243–249
Sun, X., see S.Y. Chiu 96/97 (1999) 327–336
Sviridenko, M.I., see A.A. Ageev 93 (1999) 149–156
Swaminathan, R.P., see J. Franco 96/97 (1999) 89–106
Szwarcfiter, J.L., see C.M.H. de Figueiredo 91 (1999) 293–297
Szwarcfiter, J.L., see E. Prisner 94 (1999) 321–328

Tallini, L.G. and U. Vaccaro, Efficient m-ary balanced codes 92 (1999) 17– 56
Tamaki, H., see Q.-P. Gu 100 (2000) 169–181
Tang, G., see C.-Y. Lee 100 (2000) 133–135
Tay, E.G., see K.M. Koh 98 (2000) 103–120
Telle, J.A., see M.M. Halldórsson 99 (2000) 39– 54
Tian, F., B. Wei and L. Zhang, Hamiltonicity in 3-domination-critical graphs with $\alpha = \delta + 2$ 92 (1999) 57– 70
Tittmann, P., Partitions and network reliability 95 (1999) 445–453
Tomescu, I., Some extremal properties of the degree distance of a graph 98 (2000) 159–163
Torabi, R., see G.B. Khosrovshahi 95 (1999) 361–376
Toth, P., see M. Dell'Amico 100 (2000) 17– 48
Trubian, M., see G.Righini 91 (1999) 235–242
Trystram, D., see J. Błażewicz 94 (1999) 35– 50
Tsai, S.-C., see K. Friedl 99 (2000) 443–454
Tu, F., see X. Qi 98 (2000) 131–145
Tuza, Z. and V. Voloshin, Uncolorable mixed hypergraphs 99 (2000) 209–227

Uemura, K., T. Yaku and K. Sugita, Induced permutation automata and coverings of strongly connected automata 91 (1999) 243–249
Urquhart, A., The symmetry rule in propositional logic 96/97 (1999) 177–193
Usha, M., see T.S. Arthanari 98 (2000) 173–190

Vaccaro, U., see L.G. Tallini 92 (1999) 17– 56
Van Gelder, A., Complexity analysis of propositional resolution with autarky pruning 96/97 (1999) 195–221
Van Hoesel, S. and A. Wagelmans, On the complexity of postoptimality analysis of 0/1 programs 91 (1999) 251–263
van Maaren, H., Elliptic approximations of propositional formulae 96/97 (1999) 223–244
van Maaren, H., see J.P. Warners 99 (2000) 227–244
Veldman, H.J., see D. Bauer 99 (2000) 317–321
Veldman, H.J., see D. Bauer 99 (2000) 323–329
Ventura, J.A., see M.J. Dinneen 93 (1999) 205–232

Verrall, H., Compatible Hamilton decompositions of directed wrapped butterfly graphs 91 (1999) 265–271
Verri, M.C., see D. Merlini 91 (1999) 197–213
Verschelde, J., see I.Z. Emiris 93 (1999) 21– 32
Voloshin, V., see Z. Tuza 99 (2000) 209–227

Wagelmans, A., see S. Van Hoesel 91 (1999) 251–263
Wagler, A., Critical edges in perfect line graphs and some polyhedral consequences 95 (1999) 455–466
Wagner, D., see U. Brandes 92 (1999) 91–110
Wahl, T., see O. Karch 93 (1999) 89–108
Waksman, Z., see A. Sebö 91 (1999) 305–311
Waligóra, G., see J. Józefowska 94 (1999) 263–285
Wambach, G., see M. Peter 99 (2000) 157–167
Warners, J.P. and H. van Maaren, Recognition of tractable satisfiability problems through balanced polynomial representations 99 (2000) 227–244
Wassermann, A., see A. Betten 95 (1999) 109–114
Wegener, I., see P. Fischer 91 (1999) 83– 92
Węglarz, J., see J. Józefowska 94 (1999) 263–285
Wei, B., see F. Tian 92 (1999) 57– 70
Weihe, K., see U. Brandes 92 (1999) 91–110
Wenk, C., see C. Hipke 93 (1999) 75– 88
Wilson, M.C., see M.J. Dinneen 93 (1999) 205–232
Woan, W.-j., see P. Peart 98 (2000) 255–263
Woeginger, G.J., see V.G. Deĭneko 99 (2000) 413–425
Woeginger, G.J., Sensitivity analysis for knapsack problems: another negative result 92 (1999) 247–251
Wolkowicz, H. and Q. Zhao, Semidefinite programming relaxations for the graph partitioning problem 96/97 (1999) 461–479
Wormald, N.C., see M.P. Ng 98 (2000) 227–235

Yaku, T., see K. Uemura 91 (1999) 243–249
Yao, T., Y. Guo and K. Zhang, Pancyclic out-arcs of a vertex in tournaments 99 (2000) 245–249
Yeo, A., see J. Bang-Jensen 95 (1999) 61– 72
Yu, M.-L., see G. MacGillivray 91 (1999) 143–153

Zakeri, G., see M.J. Dinneen 93 (1999) 205–232
Zhang, F. and C. An, Acyclic molecules with greatest HOMO–LUMO separation 98 (2000) 165–171
Zhang, F. and H. Li, On acyclic conjugated molecules with minimal energies 92 (1999) 71– 84

Zhang, K., see T. Yao 99 (2000) 245–249
Zhang, L., see F. Tian 92 (1999) 57– 70
Zhang, S., On the nonexistence of extremal self-dual codes 91 (1999) 277–286
Zhang, Z., see R. Ahlswede 95 (1999) 3– 9
Zhao, Q., see H. Wolkowicz 96/97 (1999) 461–479
Zhu, W.R., see D. Granot 100 (2000) 67– 84
Zhu, X., see G.J. Chang 100 (2000) 145–153
Zighem, I., see R. Cherifi 94 (1999) 101–139
Zioło, I.A., Subtrees of bipartite digraphs — the minimum degree condition 99 (2000) 251–259
Zissimopoulos, V., see E. Angel 99 (2000) 261–277

ELSEVIER

DISCRETE
APPLIED
MATHEMATICS

Book Announcements

Daniel Benest and Claude Froeschle
ANALYSIS AND MODELING OF DISCRETE DYNAMICAL SYSTEMS
Gordon and Breach Science Publishers, Canada
1998, 319 pages

Series Editors' Preface

Editors' Introduction

Part I: Numerical Tools and Modeling
1. Modeling Mappings: An Aim and a Tool for the Study of Dynamical Systems
2. Spectra of Stretching Numbers and Helicity Angles
3. Diffusion and Transient Spectra in a 4-Deminsional Symplectic Mapping
4. Distribution of Periodic Orbits in 2-D Dynamical Systems
5. Symplectic Integrators

Part II: Analytical Methods
1. Rigorous and Numerical Determination of Rotational Invariant Curves for the Standard Map
2. Interpolation of Discrete Hamiltonian Systems
3. Standard and Anomalous Diffusion in Dynamical Systems

Part III: Examples of Application
1. Symplectic Maps and Their Use in Celestial Mechanics
2. Perturbation Theory for Volume Preserving Maps: Application to the Magnetic Field Lines in Plasma Physics
3. The Use of Mappings for Stability Problems in Beam Dynamics

Vijay Chandru and John Hooker
OPTIMIZATION METHODS FOR LOGICAL INFERENCE
John Wiley & Sons, New York
1999, 365 pages

Preface

Chapter 1 Introduction
1.1 Logic and Mathematics: The Twain Shall Meet

1.2 Inference Methods for Logic Models
1.3 Logic Modeling Meets Mathematical Modeling
1.4 The Difficulty of Inference

Chapter 2 Propositional Logic: Special Cases
2.1 Basic Concepts of Propositional Logic
2.2 Integer Programming Models
2.3 Horn Polytopes
2.4 Quadratic and Renameable Horn Systems
2.5 Nested Clause Systems
2.6 Extended Horn Systems
2.7 Problems with Integral Polytopes
2.8 Limited Backtracking

Chapter 3 Propositional Logic: The General Case
3.1 Two Classic Inference Methods
3.2 Generating Hard Problems
3.3 Branching Methods
3.4 Tableau Methods
3.5 Cutting Plane Methods
3.6 Resolution of 0-1 Inequalities
3.7 A Set-Covering Formulation with Facet Cuts
3.8 A Nonlinear Programming Approach
3.9 Tautology checking in Logic Circuits
3.10 Inference as Projection
3.11 Other Approaches

Chapter 4 Probabilistic and Related Logics
4.1 Probabilistic Logic
4.2 Bayesian Logic
4.3 Dempster-Shafer Theory
4.4 Confidence Factors in Rule Systems

Chapter 5 Predicate Logic
5.1 Basic Concepts of Predicate Logic
5.2 Partial Instantiation Methods
5.3 A Method Based on Hypergraphs
5.4 An Infinite 0-1 Programming Model
5.5 The Logic of Arithmetic

Chapter 6 Nonclassical and Many-Valued Logics
6.1 Nonmonotonic Logics
6.2 Many-Valued Logics
6.3 Modal Logics
6.4 Constraint Logic Programming

W. J. Cook, W. H. Cunningham, W. R. Pulleyblank and A. Schrijver
COMBINATORIAL OPTIMIZATION
John Wiley & Sons, Chichester, New York, Weinheim, Brisbane, Singapore, Toronto
1998, 355 pages

1 Problems and Algorithms
- 1.1 Two Problems
- 1.2 Measuring Running Times

2 Optimal Trees and Paths
- 2.1 Minimum Spanning Trees
- 2.2 Shortest Paths

3 Maximum Flow Problems
- 3.1 Network Flow Problems
- 3.2 Maximum Flow Problems
- 3.3 Applications of Maximum Flow and Minimum Cut
- 3.4 Push-Relabel Maximum Flow Alogrithms
- 3.5 Minimum Cuts in Undirected Graphs
  - 3.5.1 Global Minimum Cuts
  - 3.5.2 Cut-Trees
- 3.6 Multicommodity Flows

4 Minimum-Cost Flow Problems
- 4.1 Minimum-Cost Flow Problems
- 4.2 Primal Minimum-Cost Flow Algorithms
- 4.3 Dual Minimum-Cost Flow Algorithms
- 4.4 Dual Scaling Algorithms

5 Optimal Matchings
- 5.1 Matchings and Alternating Paths
- 5.2 Maximum Matching
- 5.3 Minimum-Weight Perfect Matchings
- 5.4 T-Joins and Postman Problems
- 5.5 General Matching Problems
- 5.6 Geometric Duality and the Goemans-Williamson Algorithm

6 Integrality of Polyhedra
- 6.1 Convex hulls
- 6.2 Polytopes
- 6.3 Facets
- 6.4 Integral Polytopes
- 6.5 Total Unimodularity
- 6.6 Total Dual Integrality

6.7 Cutting Planes
6.8 Separation and Optimization

7 The Traveling Salesman Problem
7.1 Introduction
7.2 Heuristics for the TSP
7.3 Lower Bounds
7.4 Cutting Planes
7.5 Branch and Bound

8 Matroids
8.1 Matroids and the Greedy Algorithm
8.2 Matroids: Properties, Axioms, Constructions
8.3 Matroid Intersection
8.4 Applications of Matroid Intersection
8.5 Weighted Matroid Intersection

9 $\mathcal{NP}$ and $\mathcal{NP}$-Completeness
9.1 Introduction
9.2 Words
9.3 Problems
9.4 Algorithms and Running Time
9.5 The Class $\mathcal{NP}$
9.6 $\mathcal{NP}$-Completeness
9.7 $\mathcal{NP}$-Completeness of the Satisfiability Problem
9.8 $\mathcal{NP}$-Completeness of Some Other Problems
9.9 Turing Machines

APPENDIX A Linear Programming

Bibliography
Index

M. A. Goberna and M. A. Lopez
LINEAR SEMI-INFINITE OPTIMIZATION
John Wiley & Sons, Chichester, New York, Weinheim, Brisbane, Singapore, Toronto
1998, 343 pages

Part I: Modelling
1 Modelling with the Primal Problem
1.1 The primal LSIP problem
1.2 Approximation
1.3 Separation of sets in pattern recognition
1.4 Environmental policies

1.5 Generalized Neyman-Pearson problem for grouped data
1.6 Optimal experimental design in regression
1.7 Constrained multinomial maximum-likelihood estimation
1.8 Mathematical programming
Exercises
Notes

2 Modelling with the Dual Problem
2.1 Generalized finite sequences
2.2 The dual problem
2.3 Calculating the Chebyshev point-to-set distance
2.4 Measuring the efficiency of an industrial process
2.5 A generalized location problem
2.6 Robustness in Bayesian statistics
Exercises
Notes

Part II: Linear Semi-infinite Systems
3 Alternative Theorems
3.1 Linear inequality systems in pattern recognition
3.2 Farkas and Gale Alternative Theorems
3.3 Other alternative theorems
Exercises
Notes

4 Consistency
4.1 Extended solutions
4.2 Consistency tests
4.3 Classifying redundant inequalities
Exercises
Notes

5 Geometry
5.1 Introduction
5.2 On some classes of semi-infinite systems
5.3 Geometry of the solution set
5.4 Equivalent systems
Exercises
Notes

6 Stability
6.1 Stability criteria
6.2 Stability of consistent systems
6.3 Stability of inconsistent systems

6.4 Stability of continuous systems
6.5 Stability and redundancy
Exercises
Notes

Part III: Theory of Linear Semi-infinite Programming
7 Optimality
7.1 Introduction
7.2 Primal optimality conditions
7.3 Dimension of the optimal set
7.4 Optimality criteria for the dual
7.5 Optimality conditions for the convex SIP
Exercises
Notes

8 Duality
8.1 Introduction
8.2 Duality gap and the optimal value function
8.3 Discretizable and reducible problems
8.4 Uniform duality
8.5 Approximating optimal solutions
8.6 Duality theory for convex SIP
Exercises
Notes

9 Extremality and Boundedness
9.1 Introduction
9.2 On the primal feasible and optimal sets
9.3 On the dual feasible and optimal sets
Exercises
Notes

10 Stability and Well-Posedness
10.1 Introduction
10.2 Optimal value function
10.3 Hadamard well-posedness
10.4 Optimal set mapping
10.5 Unicity
Exercises
Notes

Part IV: Methods of Linear Semi-infinite Programming
11 Local Reduction and Discretization Methods
11.1 Introduction

11.2 The local reduction approach
11.3 Grid discretization methods
11.4 Cutting-plane discretization
11.5 The three-phase method
11.6 A test problem
Exercises
Notes

12 Simplex-Like and Exchange Methods
12.1 Introduction
12.2 A purification method for the dual problem
12.3 A dual-simplex primal-exchange method
12.4 A purification scheme for the primal problem
12.5 A primal-simplex dual-exchange method
Exercises
Notes

Appendix
A.1 Convex sets
A.2 Convex functions
Notes

Symbols and Abbreviations
References
Index

ANNOTATED BIBLIOGRAPHIES IN COMBINATORIAL OPTIMIZATION
Edited by Mauro Dell'Amico, Francesco Maffioli and Silvano Martello
John Wiley & Sons, Chichester, New York, Weinheim, Brisbane, Singapore, Toronto
1997, 495 pages

Preface
List of Contributors
1. Selected Books in and around Combinatorial Optimization
F. Maffioli, S. Martello
2. Hardness of Approximation
V. Kann, A. Panconesi
3. Polyhedral Combinatorics
K. Aardal, R. Weismantel
4. Branch-and-Cut Algorithms
A. Caprara, M. Fischetti
5. Matroids and Submodular Functions
A. Frank

6. Perfect, Ideal and Balanced Matrices
M. Conforti, G. Cornuéjols, A. Kapoor, K. Vušković
7. Advances in Linear Optimization
C. Roos, T. Terlaky
8. Decomposition and Column Generation
F. Soumis
9. Stochastic Integer Programming
L. Stougie, M. H. van der Vlerk
10. Randomized Algorithms
M. Goemans, D. Karger, J. Kleinberg
11. Local Search
E. Aarts, M. Verhoeven
12. Sequencing and Scheduling
J. A. Hoogeveen, J. K. Lenstra, S. L. Van de Velde
13. The Traveling Salesman Problem
M. Jünger, G. Reinelt, G. Rinaldi
14. Vehicle Routing
G. Laporte
15. Max-Cut Problem
M. Laurent
16. Location Problems
M. Labbé, F. V. Louveaux
17. Flows and Paths
R. K. Ahuja
18. Network Design
A. Balakrishnan, T.L. Magnanti, P. Mirchandani
19. Network Connectivity
S. Raghavan, T. L. Magnanti
20. Linear Assignment
M. Dell'Amico, S. Martello
21. Quadratic and Three-Dimensional Assignments
R.E. Burkard, E. Çela
22. Cutting and Packing
H. Dyckhoff, G. Scheithauer, J. Terno
23. Set Covering Problem
S. Ceria, P. Nobili, A. Sassano
24. Combinatorial Topics in VLSI Design
R.H. Möhring, D. Wagner
25. Computational Molecular Biology
M. Vingron, H.-P. Lenhof, P. Mutzel

Author Index

Tino Gramss, Stefan Bornholdt, Michael Gross, Melanie Mitchell and Thomas Pellizzari
NON-STANDARD COMPUTATION: MOLECULAR COMPUTATION–CELLULAR AUTOMATA–EVOLUTIONARY ALGORITHMS–QUANTUM COMPUTERS
Wiley-Vch, New York
1998, 221 pages

1. Introduction to Non-standard Computation

2. Molecular Computation
   - 2.1 Computational Molecules in the Cell
   - 2.2 Artificial Biomolecular Systems
   - 2.3 Supramolecular Systems
   - 2.4 Future Prospects
   - 2.5 Glossary of Biological/Biochemical/Chemical Terminology Used
   - 2.6 Acknowledgements

3. Genetic Algorithms
   - 3.1 Introduction
   - 3.2 An Examples: A Perfect Lens from Evolution
   - 3.3 How Does It Really Work? Tricks and Variations
   - 3.4 Applications of Genetic Algorithms
   - 3.5 Model Inversion as a Hard Optimization Problem
   - 3.6 Models of Genetic Algorithms
   - 3.7 What next?

4. Computation in Cellular Automata: A Selected Review
   - 4.1 Introduction
   - 4.2 Von Neumann's Self-Reproducing Cellular Automation
   - 4.3 Universal Computation in Cellular Automata
   - 4.4 Dynamics and Computation in Cellular Automata
   - 4.5 The Firing Squad Synchronization Problem
   - 4.6 Parallel Formal-Language Recognition by Cellular Automata
   - 4.7 Parallel Arithmetic by Cellular Automata
   - 4.8 Evolving Cellular Automata with Genetic Algorithms
   - 4.9 Conclusion

5. The Theory of Quantum Computation: An Introduction
   - 5.1 A Brief History of Quantum Computation
   - 5.2 Quantum Computers: A Simple Examples
   - 5.3 A Classical, Reversible Turing Machine
   - 5.4 Quantum Turing Machines
   - 5.5 Quantum Parallelism
   - 5.6 Quantum—Mechanical, Locally Connected Computing Systems

5.7 Feynman's Serial Computer
5.8 Margolus Cellular Automaton
5.9 Realizing Quantum Computers
5.10 Universal Quantum Turing Machines
5.11 Parallelizability
5.12 Undecidability
5.13 Summary
5.14 Acknowledgements

6. Quantum Computers: First Steps Towards a Realization
6.1 Introduction
6.2 Basic Building Blocks
6.3 Experimental Approaches
6.4 The Ion Trap QC
6.5 Flying Qubits: Atoms
6.6 A Cavity Quantum Electrodynamics QC
6.7 Flying Qubits: Photons
6.8 Quantum Error Calculations
6.9 Conclusions and Outlook
6.10 Acknowledgements
6.11 Appendix: Mathematical Formalism

Dieter Jungnickel
GRAPHS, NETWORKS AND ALGORITHMS
Springer, Berlin
1999, 589 pages

Preface
1. Basic Graph Theory
2. Algorithms and Complexity
3. Shortest Paths
4. Spanning Tress
5. The Greedy Algorithm
6. Flows
7. Applications in Combinatorics
8. Colourings
9. Circulations
10. Synthesis of Networks
11. Connectivity
12. Matchings
13. Weighted Matchings
14. A Hard Problem: The TSP

Wilfred Kaplan
MAXIMA AND MINIMA WITH APPLICATIONS: PRACTICAL OPTIMIZATION AND DUALITY
John Wiley & Sons, New York
1999, 284 pages

Preface
1. Maxima and Minima in Analytic Geometry
2. Side Conditions
3. Optimization
4. Fenchel-Rockafellar Duality Theory
Appendix

Ioannis Karatzas
LECTURES ON THE MATHEMATICS OF FINANCE
American Mathematical Society, Providence, Rhode Island
1997, 149 pages

Chapter 0. The model
0.1. Introduction
0.2. Portfolio and consumption rules
0.3. Completeness
0.4. Hedging

Part 1. Complete markets
Chapter 1. Pricing
1.1. Introduction
1.2. European contingent claims
1.3. Examples
1.4. American contingent claims

Chapter 2. Optimization
2.1. Introduction
2.2. Martingale methods
2.3. Ramifications
2.4. Constant coefficients
2.5. Drawdown constraints
2.6. Goal problems

Chapter 3. Equilibrium
3.1. Introduction
3.2. The market model
3.3. Individual optimization problem

3.4. Equilibrium
3.5. Representative agent
3.6. Existence and uniqueness of equilibrium
3.7. Equilibrium prices
3.8. Examples

Part 2. Incomplete markets
Chapter 4. Hedging
4.1. The model
4.2. Embedding
4.3. Contingent claims
4.4. Upper hedging price
4.5. Attainability
4.6. Lower hedging price

Chapter 5. Optimization
5.1. The problem
5.2. Embedding
5.3. Optimality conditions
5.4. Duality
5.5. Existence
5.6. Relative entropy
5.7. Constant coefficients

Chapter 6. Pricing
6.1. Introduction
6.2. A fair price
6.3. Examples

Chapter 7. Transaction costs
7.1. The model
7.2. Contingent claims
7.3. Hedging
7.4. Optimization
7.5 Pricing

Appendix A. Historical Notes
A.1. Chapter 0
A.2. Chapter 1
A.3. Chapter 2
A.4. Chapter 3
A.5. Chapter 4
A.6. Chapter 5
A.7. Chapter 6
A.8. Chapter 7

Bibliography

David G. Luenberger
OPTIMIZATION BY VECTOR SPACE METHODS
John Wiley & Sons, New York, Chichester, Weinheim, Brisbane, Singapore, Toronto
1969, 326 pages

1 INTRODUCTION
1.1 Motivation
1.2 Applications
1.3 The Main Principles
1.4 Organization of the Book

2 LINEAR SPACES
2.1 Introduction
VECTOR SPACES
2.2 Definition and Examples
2.3 Subspaces, Linear Combinations, and Linear Varieties
2.4 Convexity and Cones
2.5 Linear Independence and Dimension

NORMED LINEAR SPACES
2.6 Definition and Examples
2.7 Open and Closed Sets
2.8 Convergence
2.9 Transformations and Continuity
*2.10 The l_p and L_p Spaces
2.11 Banach Spaces
2.12 Complete Subsets
*2.13 Extreme Values of Functionals, and Compactness
*2.14 Quotient Spaces
*2.15 Denseness and Separability
2.16 Problems
References

3. HILBERT SPACE
3.1 Introduction
PRE-HILBERT SPACES
3.2 Inner Products
3.3 The Projection Theorem
3.4 Orthogonal Complements
3.5 The Gram-Schmidt Procedure

APPROXIMATION
3.6 The Normal Equations and Gram Matrices

3.7 Fourier Series
*3.8 Complete Orthonormal Sequences
3.9 Approximation and Fourier Series

OTHER MINIMUM NORM PROBLEMS
3.10 The Dual Approximation Problem
*3.11 A Control Problem
3.12 Minimum Distance to a Convex Set
3.13 Problems
References

4. LEAST-SQUARES ESTIMATION
4.1 Introduction
4.2 Hilbert Space of Random Variables
4.3 The Least-Squares Estimate
4.4. Minimum-Variance Unbiased Estimate (Gauss-Markov Estimate)
4.5 Minimum-Variance Estimate
4.6 Additional Properties of Minimum-Variance Estimates
4.7 Recursive Estimation
4.8 Problems
References

5. DUAL SPACES
5.1 Introduction
LINEAR FUNCTIONALS
5.2 Basic Concepts
5.3 Duals of Some Common Banach Spaces

EXTENSION FORM OF THE HAHN-BANACH THEOREM
5.4 Extension of Linear Functionals
5.5 The Dual of $C[a, b]$
5.6 The Second Dual Space
5.7 Alignment and Orthogonal Complements
5.8 Minimum Norm Problems
5.9 Applications
*5.10 Weak Convergence

GEOMETRIC FORM OF THE HAHN-BANACH THEOREM
5.11 Hyperplanes and Linear Functionals
5.12 Hyperplanes and Convex Sets

*5.13 Duality in Minimum Norm Problems
5.14 Problems
References

6. LINEAR OPERATORS AND ADJOINTS
6.1 Introduction
6.2 Fundamentals

INVERSE OPERATORS
6.3 Linearity of Inverses
6.4 The Banach Inverse Theorem

ADJOINTS
6.5 Definition and Examples
6.6 Relations between Range and Nullspace
6.7 Duality Relations for Convex Cones
*6.8 Geometric Interpretation of Adjoints

OPTIMIZATION IN HILBERT SPACE
6.9 The Normal Equations
6.10 The Dual Problem
6.11 Pseudoinverse Operators
6.12 Problems
References

7. OPTIMIZATION OF FUNCTIONALS
7.1 Introduction

LOCAL THEORY
7.2 Gateaux and Fréchet Differentials
7.3 Fréchet Derivatives
7.4 Extrema
*7.5 Euler-Lagrange Equations
*7.6 Problems with Variable End Points
*7.7 Problems with Constraints

GLOBAL THEORY
7.8 Convex and Concave Functionals
*7.9 Properties of the Set $[f, C]$
7.10 Conjugate Convex Functionals
7.11 Conjugate Concave Functionals
7.12 Dual Optimization Problems
*7.13 Min-Max Theorem of Game Theory
7.14 Problems
References

8. GLOBAL THEORY OF CONSTRAINED OPTIMIZATION
8.1 Introduction
8.2 Positive Cones and Convex Mappings
8.3 Lagrange Multipliers
8.4 Sufficiency
8.5 Sensitivity
8.6 Duality
8.7 Applications
8.8 Problems
References

9. LOCAL THEORY OF CONSTRAINED OPTIMIZATION
9.1 Introduction

LAGRANGE MULTIPLIER THEOREMS
9.2 Inverse Function Theorem
9.3 Equality Constraints
9.4 Inequality Constraints (Kuhn-Tucker Theorem)

OPTIMAL CONTROL THEORY
9.5 Basic Necessary Conditions
*9.6 Pontryagin Maximum Principle
9.7 Problems
References

10. ITERATIVE METHODS OF OPTIMIZATION
10.1 Introduction

METHODS FOR SOLVING EQUATIONS
10.2 Successive Approximation
10.3 Newton's Method

DESCENT METHODS
10.4 General Philosophy
10.5 Steepest Descent

CONJUGATE DIRECTION METHODS
10.6 Fourier Series
*10.7 Orthogonalization of Moments
10.8 The Conjugate Gradient Method

METHODS FOR SOLVING CONSTRAINED PROBLEMS
10.9 Projection Methods
10.10 The Primal-Dual Method
10.11 Penalty Functions

10.12 Problems
References

SYMBOL INDEX

SUBJECT INDEX

Alfred J. Menezes, Paul C. van Oorschot and Scott A. Vanstone
HANDBOOK OF APPLIED CRYPTOGRAPHY
CRC Press, Boca Raton, New York, London, Tokyo
1997, 780 pages

List of Tables
List of Figures
Foreward
Preface

1 Overview of Cryptography
2 Mathematical Background
3 Number-Theoretic Reference Problems
4 Public-Key Parameters
5 Pseudorandom Bits and Sequences
6 Stream Ciphers
7 Block Ciphers
8 Public-Key Encryption
9 Hash Functions and Data Integrity
10 Identification and Entity Authentication
11 Digital Signatures
12 Key Establishment Protocols
13 Key Management Techniques
14 Efficient Implementation
15 Patents and Standards

Appendix
References
Index

Vera Pless
INTRODUCTION TO THE THEORY OF ERROR CORRECTING CODES,
Third Edition
John Wiley & Sons, Chichester, New York, Weinheim, Brisbane, Singapore, Toronto
1998, 207 pages

1 Introductory Concepts
1.1 Introduction
1.2 Basic Definitions
1.3 Weight, Minimum Weight, and Maximum-Likelihood Decoding
Problems

2 Useful Background
2.1 Syndrome Decoding
2.2 Perfect Codes, Hamming Codes, Sphere-Packing Bound
2.3 Packing Radius, Covering Radius, MDS Codes, and Some Bounds
2.4 Self-Dual Codes, Golay Codes
2.5 Reed-Muller Codes
2.6 Puncturing, Extending, and Shortening
Problems

3 A Double-Error-Correcting BCH Code and a Finite Field of 16 Elements
3.1 The Problem
3.2 Polynomials
3.3 A Finite Field of 16 Elements
3.4 Double-Error-Correcting Bose-Chaudhuri-Hocquenghem (BCH) Code
Problems

4 Finite Fields
4.1 Groups
4.2 Structure of a Finite Field
4.3 Minimal Polynomials
4.4 Factoring $x^n - 1$
Problems

5 Cyclic Codes
5.1 Origin and Definition of Cyclic Codes
5.2 How to Find Cyclic Codes: The Generator Polynomial
5.3 Generator Polynomial of the Dual Code
5.4 Idempotents and Minimal Ideals for Binary Cyclic Codes
Problems

6 Group of a Code and Quadratic Residue (QR) Codes
6.1 Some Cyclic Codes We Know
6.2 Permutation Groups

6.3 Group of a Code
6.4 Definition of Quadratic Residue (QR) Codes
6.5 Extended QR Codes, Square Root Bound, and Groups of QR Codes
6.6 Permutation Decoding
6.7 Decoding the Golay Code
Problems

7 Bose-Chaudhuri-Hocquenghem (BCH) Codes
7.1 Cyclic Codes Given in Terms of Roots
7.2 Vandermonde Determinants
7.3 Definition and Properties of BCH Codes
7.4 Reed-Solomon Codes
7.5 More on the Minimum Distance
7.6 Decoding BCH Codes
Problems

8 Weight Distributions
8.1 Preliminary Concepts and a Theorem on Weights in Homogeneous Codes
8.2 MacWilliams Equations
8.3 Pless Power Moments
8.4 Gleason Polynomials
Problems

9 Designs and Games
9.1 Designs
9.2 Designs and Codes
9.3 Assmus-Mattson Theorem and a Design-Decoding Scheme
9.4 Symmetry Codes
9.5 Games
9.6 Games and Codes
9.7 Greedy Codes
Problems

10 Some Codes Are Unique
10.1 The Hamming Code and the Ternary Golay Code Are Unique
10.2 The Steiner Systems S(5, 8, 24) Is Unique and So Is a Binary [24, 12, 8] Code
10.3 "Glue"
10.4 Residual Codes and the Griesmer Bound

10.5 Some Nonlinear Codes
10.6 Z_4 Codes and Their Gray Images
Problems

Appendix
References
Index

Berc Rustem
ALGORITHMS FOR NONLINEAR PROGRAMMING & MULTIPLE OBJECTIVE DECISIONS
John Wiley & Sons, Chichester, New York, Weinheim, Brisbane, Singapore, Toronto
1998, 304 pages

I INTRODUCTION
1 Introduction: Optimization of a Single Objective
1 The dynamic decision problem and static optimization
2 Basic optimality conditions
3 Necessary and sufficient conditions for nonlinearly constrained optimization
4 A simple Gauss–Newton algorithm for optimal decision problems
5 A quasi-Newton implementation
6 Comments and notes
References

II QUADRATIC PROGRAMMING ALGORITHMS AND MULTI-OBJECTIVE OPTIMIZATION
2 Quadratic Programming Algorithms
1 The quadratic programming problem
2 Active set algorithm based on null space of the constraints
3 Active set algorithm based on range space of the constraints
4 Interior point algorithm for quadratic programming
5 Concluding remarks
6 Comments and notes
References

Multiple-Objective Optimization 1—Interactive Search for Acceptable Decisions: Updating Quadratic Objective Weights
3 The multi-objective decision problem
1.1 Projections in $\mathbb{R}^n$
1.2 Motivation for updating the weighting matrix
2 The interactive method for determining the weighting matrix
3 Properties of the method: linear equality constraints

4 Revealed preferences, choice of preferred value and sensitivity
4.1 Inverse optimal control and revealed preferences
4.2 Choosing the desired, or bliss, value as the preferred solution
4.3 The issue of sensitivity
5 Concluding remarks
6 Comments and notes
References

4 Multiple-Objective Optimization 2—Interactive Search for Acceptable Decisions: Updating Bliss Points and Arbitrariness of Shadow Prices
1 Introduction: diagonal quadratic objective functions
2 Specifying diagonal quadratic objective functions
3 Diagonal version of nondiagonal quadratics and complexity of the algorithm
3.1 Equivalence of diagonal and nondiagonal approaches
3.2 Complexity of the algorithm
4 The arbitrariness of shadow prices
5 Concluding remarks
6 Comments and notes
References

5 Multiple-Objective Optimization 3—Convergence and Complexity of Decision Processes
1 Introduction
2 Polynomial-time algorithms for multiple objectives
3 Properties of the methods: general convex and nonlinear constraint
4 Khachian's ellipsoid algorithm: complexity of the decision process
5 Discussion of the matrix updates
6 Concluding remarks
7 Comments and notes
References

III ALGORITHMS FOR NONLINEAR OPTIMIZATION AND EQUILIBRIA

6 Nonlinear Optimization with Convex Constraints—The Goldstein-Levitin-Polyak Algorithm
1 The convex optimization problem
2 The GLP algorithm
2.1. The algorithm
2.2 Parallel computation using proximal optimization
3 Convergence of the algorithm
4 Unit stepsizes and superlinear convergence rates
5 Comments and notes
References

7 Nonlinear Optimization with Equality and Inequality Constraints
1 Nonlinear programming augmented Lagrangian SQP algorithm
1.1 Convexification
1.2 The quadratic programming subproblem
2 The SQP algorithms
3 Global convergence of the algorithms
4 Convergence to unit stepsizes
5 An interior point algorithm
6 Concluding remarks
7 Comments and notes
References

8 Convergence Rates of SQP Algorithms
1 Introduction to the convergence rates of SQP algorithms
1.1 Studying the convergence rates of the variable and variable–multiple pair
1.2 An outline of the convergence rate results
2 Q-superlinear rate of the variable and two-step Q-superlinear rate of the variable–multiplier pair
3 Two-step Q-superlinear convergence of the variable and three-step Q-superlinear convergence of the variable–multiplier pair
4 The effect of inequality constraints
5 Concluding remarks
6 Comments and notes
References

9 Algorithms for Equilibria and Games
1 Computation of equilibria and solution of nonlinear equations
1.1 Games and equilibria
1.2 Solution of systems of equations
2 Newton-type algorithms
3 Convergence of Newton-type algorithms
4 Computation of perfect foresight
5 Reordering systems of equations
6 Concluding remarks
References

IV UNCERTAINTY
10 Multiple Objects under Uncertainty—Mean-Variance Optimization for Multicurrency Portfolios
1 Introduction to portfolio optimization
1.1 Mean-variance optimization within a single currency
1.2 The effect of investments in multiple currencies

2 Multicurrency mean-variance portfolios
3 Computing the optimal portfolio
4 Concluding remarks
5 Comments and notes
References

11 Mean-Variance Optimization: The Nonlinear Case
1 Introduction to the nonlinear problem
1.1 The stochastic problem
1.2 The decision making process under uncertainty
2 The sensitivity approach to robust policy
3 Robustness with respect to the policy objective function
3.1 Sensitivity and robust optimal policy
3.2 Mean-variance formulation
4 Computing expectations using Monte Carlo simulations
5 Robustness with respect to endogenous variables
6 An example
7 Concluding remarks
8 Comments and notes
References

12 A discrete Min–Max Algorithm for Multiple Objectives
1 The min–max approach to multiple objectives
1.1 The decision problem with rival objectives
1.2 An example
2 Preliminary concepts and results
2.1 The discrete min–max formulation
2.2 Convexification
3 The algorithm
4 Global convergence
5 The attainment of unit stepsizes
References

Index

Donald M. Topkins
SUPERMODULARITY AND COMPLEMENTARITY
Princeton University Press, Princeton, New Jersey
1998, 268 pages

Chapter 1 Introduction

Chapter 2 Lattices, Supermodular Functions, and Related Topics
- 2.1 Introduction
- 2.2 Partially Ordered Sets and Lattices
  - 2.2.1 Definitions, Notation, and Some Basic Properties
  - 2.2.2 Sublattice Structure
- 2.3 Completeness and Topological Properties
- 2.4 Induced Set Ordering
- 2.5 Fixed Points
- 2.6 Supermodular Functions on a Lattice
  - 2.6.1 Characterization and Complementarity
  - 2.6.2 Transformations
  - 2.6.3 Ordinal Generalizations
  - 2.6.4 Log-Supermodularity
- 2.7 Maximizing a Supermodular Function
  - 2.7.1 Sets of Maximizers
  - 2.7.2 Preservation of Supermodularity
- 2.8 Increasing Optimal Solutions
  - 2.8.1 Sufficient Conditions
  - 2.8.2 Necessary Conditions
- 2.9 Complementarity Equivalences

Chapter 3 Optimal Decision Models
- 3.1 Introduction
- 3.2 Matching
- 3.3 Comparative Statics of the Firm
  - 3.3.1 Model of the Firm
  - 3.3.2 Sufficient Conditions
  - 3.3.3 Necessary Conditions
- 3.4 Transportation and Transshipment Problems
  - 3.4.1 Transportation Problem
  - 3.4.2 Transshipment Problem
- 3.5 Dynamic Economic Lot Size Production Models, Acyclic Networks
  - 3.5.1 Acyclic Networks
  - 3.5.2 Dynamic Economic Lot Size Production Models
- 3.6 Production Planning
- 3.7 Minimum Cuts, Maximum Closures, and the Selection Problem
  - 3.7.1 Minimum Cut Problem
  - 3.7.2 Maximum Closure Problem
  - 3.7.3 Selection Problem
  - 3.7.4 Equivalent Combinatorial Structures

3.8 Myopic Decisions
3.8.1 General Conditions
3.8.2 Dynamic Selection Problem
3.9 Markov Decision Processes and Property-Inducing Stochastic Transformations
3.9.1 Property-Inducing Stochastic Transformations
3.9.2 Markov Decision Processes
3.10 Stochastic Inventory Problems and Supermodularity-Preserving Stochastic Transformations
3.10.1 Supermodularity-Preserving Stochastic Transformations
3.10.2 Stochastic Inventory Problems
Chapter 4 Noncooperative Games
4.1 Introduction
4.2 Existence of an Equilibrium Point, Parametric Properties
4.3 Algorithms for Approximating an Equilibrium Point
4.3.1 Round-Robin Optimization
4.3.2 Simultaneous Optimization
4.4 Examples of Supermodular Games
4.4.1 Pricing Game with Substitute Products
4.4.2 Production Game with Complementary Products
4.4.3 Multimarket Oligopoly
4.4.4 Arms Race Game
4.4.5 Trading Partner Search Game
4.4.6 Optimal Consumption Game with Multiple Products
4.4.7 Facility Location Game
4.4.8 Minimum Cut Game
Chapter 5 Cooperative Games
5.1 Introduction
5.2 Convex Games
5.2.1 The Core and the Greedy Algorithm
5.2.2 Games with a Parameter
5.2.3 Structure of the Core
5.3 Examples of Convex Games
5.3.1 Monopoly Firm
5.3.2 Monotonic Surplus Sharing
5.3.3 Aircraft Landing Fee Game
5.3.4 Trading Game
5.4 Activity Optimization Games
5.5 Examples of Activity Optimization Games
5.5.1 General Welfare Game
5.5.2 Production Game with Common Procurement of Inputs
5.5.3 Investment and Production Game

5.5.4 Activity Selection Game
5.5.5 Waste Disposal Game
5.6 Games with Complementarities That Are Not Convex Games
5.6.1 Network Design Game
5.6.2 Max-Min Game

Bibliography
Index

Peter Whittle
NEURAL NETS AND CHAOTIC CARRIERS
John Wiley & Sons, New York
1998, 206 pages

Preface
Part I: Opening and Themes
1. Introduction and Aspirations
2. Optimal Statistical Aspirations
3. Linear Links and Nonlinear Knots: the Basic Neural Net
4. Bifurcations and Chaos
Part II: Associative and Storage Memories
5. What is a Memory? The Hamming and Hopfield Nets
6. Compound and "Spurious" Traces
7. Preserving Plasticity: a Bayesian Approach
8. The Key Task: the Fixing of Fading Data. Conclusions I
9. Performance of the Probability-Maximizing Algorithm
10. Other Memories—Other Considerations
Part III: Oscillatory Operation and the Biological Model
11. Neuron Models and Neural Masses
12. Freeman Oscillators—Solo and in Concert
13. Associative Memories Incorporating the Freeman Oscillator
14. Olfactory Comparison. Conclusion II
15. Transmission Delays

Laurence A. Wolsey
INTEGER PROGRAMMING
John Wiley & Sons, Inc. New York
1998, 264 pages

Preface
Abbreviations and Notation

1. Formulations
2. Optimality, Relaxation, and Bounds
3. Well-Solved Problems
4. Matchings and Assignments
5. Dynamic Programming
6. Complexity and Problem Reductions
7. Branch and Bound
8. Cutting Plane Algorithms
9. Strong Valid Inequalities
10. Lagrangian Duality
11. Column Generation Algorithms
12. Heuristic Algorithms
13. From Theory to Solutions

Yinyu Ye
INTERIOR POINT ALGORITHMS THEORY and ANALYSIS
John Wiley & Sons, New York, Chichester, Weinheim, Brisbane, Singapore, Toronto
1997, 418 pages

1 Introduction and Preliminaries
- 1.1 Introduction
- 1.2 Mathematical Preliminaries
  - 1.2.1 Basic notations
  - 1.2.2 Convex sets
  - 1.2.3 Real functions
  - 1.2.4 Inequalities
- 1.3 Decision and Optimization Problems
  - 1.3.1 System of linear equations
  - 1.3.2 System of nonlinear equations
  - 1.3.3 Linear least-squares problem
  - 1.3.4 System of linear inequalities
  - 1.3.5 Linear programming (LP)
  - 1.3.6 Quadratic programming (QP)
  - 1.3.7 Linear complementarity problem (LCP)
  - 1.3.8 Positive semi-definite programming (PSP)
  - 1.3.9 Nonlinear programming (NP)
  - 1.3.10 Nonlinear complementarity problem (NCP)
- 1.4 Algorithms and Computation Models
  - 1.4.1 Worst-case complexity
  - 1.4.2 Condition-based complexity
  - 1.4.3 Average complexity
  - 1.4.4 Asymptotic complexity

1.5 Basic Computational Procedures
1.5.1 Gaussian elimination method
1.5.2 Choleski decomposition method
1.5.3 The Newton method
1.5.4 Solving ball-constrained linear problem
1.5.5 Solving ball-constrained quadratic problem
2 Geometry of Convex Inequalities
2.1 Convex Bodies
2.1.1 Center of gravity
2.1.2 Ellipsoids
2.2 Analytic Center
2.2.1 Analytic center
2.2.2 Dual potential function
2.2.3 Analytic central-section inequalities
2.3 Primal and Primal-Dual Potential Functions
2.3.1 Primal potential functions
2.3.2 Primal-dual potential function
2.4 Potential Functions for LP, LCP, and PSP
2.4.1 Primal potential function for LP
2.4.2 Dual potential function for LP
2.4.3 Primal-dual potential function for LP
2.4.4 Potential function for LCP
2.4.5 Potential function for PSP
2.5 Central Paths of LP, LCP, and PSP
2.5.1 Central path for LP
2.5.2 Central path for LCP
2.5.3 Central path for PSP
2.6 Notes
2.7 Exercises
3 Computation of Analytic Center
3.1 Proximity to Analytic Center
3.2 Dual Algorithms
3.2.1 Dual Newton procedure
3.2.2 Dual potential algorithm
3.2.3 Central-section algorithm
3.3 Primal Algorithms
3.3.1 Primal Newton procedure
3.3.2 Primal potential algorithm
3.3.3 Affine scaling algorithm
3.4 Primal-Dual (Symmetric) Algorithms
3.4.1 Primal-dual Newton procedure
3.4.2 Primal-dual potential algorithm

3.5 Notes
3.6 Exercises

4 Linear Programming Algorithms
4.1 Karmarkar's Algorithm
4.2 Path-Following Algorithm
4.3 Potential Reduction Algorithm
4.4 Primal-Dual (Symmetric) Algorithm
4.5 Adaptive Path-Following Alogrithm
4.5.1 Predictor-corrector algorithm
4.5.2 Wide-neighborhood algorithm
4.6 Affine Scaling Algorithm
4.7 Extensions to QP and LCP
4.8 Notes
4.9 Exercises

5 Worst-Case Analysis
5.1 Arithmetic Operation
5.2 Termination
5.2.1 Strict complementarity partition
5.2.2 Project an interior point onto the optimal face
5.3 Initialization
5.3.1 A HSD linear program
5.3.2 Solving (HSD)
5.3.3 Further analysis
5.4 Infeasible-Starting Algorithm
5.5 Notes
5.6 Exercises

6 Average-Case Analysis
6.1 One-Step Analysis
6.1.1 High-probability behavior
6.1.2 Proof of the theorem
6.2 Random-Problem Analysis I
6.2.1 High-probability behavior
6.2.2 Random linear problems
6.3. Random-Problem Analysis II
6.3.1 Termination scheme
6.3.2 Random model and analysis
6.4 Notes
6.5 Exercises

7 Asymptotic Analysis
- 7.1 Rate of Convergence
  - 7.1.1 Order of convergence
  - 7.1.2 Linear convergence
  - 7.1.3 Average order
  - 7.1.4 Error function
- 7.2 Superlinear Convergence: LP
  - 7.2.1 Technical results
  - 7.2.2 Quadratic convergence
- 7.3 Superlinear Convergence: Monotone LCP
  - 7.3.1 Predictor-corrector algorithm for LCP
  - 7.3.2 Technical results
  - 7.3.3 Quadratic convergence
- 7.4 Quadratically Convergent Algorithms
  - 7.4.1 Variant 1
  - 7.4.2 Variant 2
- 7.5 Notes
- 7.6 Exercises

8 Convex Optimization
- 8.1 Analytic Centers of Nested Polytopes
  - 8.1.1 Recursive potential reduction algorithm
  - 8.1.2 Complexity analysis
- 8.2 Convex (Non-Smooth) Feasibility
  - 8.2.1 Max-potential reduction
  - 8.2.2 Compute a new approximate center
  - 8.2.3 Convergence and complexity
- 8.3 Positive Semi-Definite Programming
  - 8.3.1 Potential reduction algorithm
  - 8.3.2 Primal-dual algorithm
- 8.4 Monotone Complementarity Problem
  - 8.4.1 A convex property
  - 8.4.2 A homogeneous MCP model
  - 8.4.3 The central path
  - 8.4.4 An interior-point algorithm
- 8.5 Notes
- 8.6 Exercises

9 Nonconvex Optimization
- 9.1 von Neumann Economic Growth Problem
  - 9.1.1 Max-potential of $\Gamma(\gamma)$
  - 9.1.2 Approximate analytic centers of $\Gamma(\gamma)$
  - 9.1.3 Central-section algorithm

9.2 Linear Complementarity Problem
9.2.1 Potential reduction algorithm
9.2.2 A class of LCPs
9.2.3 P-matrix LCP
9.3 Generalized Linear Complementarity Problem
9.3.1 Potential reduction algorithm
9.3.2 Complexity analysis
9.3.3 Further discussions
9.4 Indefinite Quadratic Programming
9.4.1 Potential reduction algorithm
9.4.2 Generating an ε-KKT point
9.4.3 Solving the ball-constrained QP problem
9.5 Approximating Quadratic Programming
9.5.1 Positive semi-definite relaxation
9.5.2 Approximation analysis
9.6 Notes
9.7 Exercises

10 Implementation Issues
10.1 Presolver
10.2 Linear System Solver
10.2.1 Solving normal equation
10.2.2 Solving augmented system
10.2.3 Numerical phase
10.2.4 Iterative method
10.3 High-Order Method
10.3.1 High-order predictor-corrector method
10.3.2 Analysis of a high-order method
10.4 Homogeneous and Self-Dual Method
10.5 Optimal-Basis Identifier
10.5.1 A pivoting algorithm
10.5.2 Theoretical and computational issues
10.6 Notes
10.7 Exercises

Bibliography
Index

Instructions to Authors

All contributions should be written in English or French, should have an abstract in English (as well as one in French if the paper is written in French) and – with the exception of Communications – should be sent in triplicate to Nelly Segal, Editorial Manager, RUTCOR Rutgers, The State University of New Jersey, 640 Bartholomew Road, Piscataway, NJ 08854-8003, USA. The authors are requested to put their mailing address on the manuscript.

Upon acceptance of an article, the author(s) will be asked to transfer copyright of the article to the Publisher. This transfer will ensure the widest possible dissemination of information.

(see also http://www.elsevier/locate/dam)

No page charge is made.

Manuscripts submitted for the Communications section, having at most 5 typewritten pages, should be sent to a member of the editorial board in triplicate. Detailed proofs do not have to be included, but results must be accompanied at least by rough outlines of their proofs. Subsequent publication in this journal or elsewhere of the full text of a research report, the outline of which has been published in the Communications section of our journal, is not excluded. Every effort shall be made for the fastest possible publication of Communications. Consequently the presentation of these manuscripts should be very clear.

Please make sure that the paper is submitted in its final form. Corrections in the proofstage, other than of printer's errors, should be avoided; costs arising from such extra corrections will be charged to the authors.
The manuscript should be prepared for publication in accordance with instructions given.

1. The manuscript must be typed on one side of the paper in double spacing with wide margins. A duplicate copy should be retained by the author.
2. Special care should be given to the preparation of the drawings for figures and diagrams. Except for a reduction in size, they will appear in the final printing in exactly the same form as they were submitted by the author; normally they will not be redrawn by the printer. In order to make a photographic reproduction possible, all drawings should be on separate sheets, with wide margins, drawn large size, in India ink, and carefully lettered. Exceptions are diagrams only containing formulae and a small number of single lines (or arrows); these can be typeset by the printer.
3. References should be listed alphabetically, in the same way as the following examples:
   For a book: W.K. Chen, Applied Graph Theory (North-Holland, Amsterdam, 1971).
   For a paper in a journal: J. Rhodes and B.R. Tilson, Lower bounds for complexity of finite semigroups, J. Pure Appl. Algebra 1 (1971) 79–95.
   For a paper in a contributed volume: M.O. Rabin, Weakly definable relations and special automata, in: Y. Bar-Hillel, ed., Mathematical Logic and Foundations of Set Theory (North-Holland, Amsterdam, 1970) 1–23.
   For an unpublished paper: D. Allen, Relations between the local and global structure of finite semigroups, Ph.D. Thesis, University of California, Berkeley, CA (1968).

Instructions for LaTeX manuscripts

The LaTeX files of papers that have been accepted for publication may be sent to the Publisher by e-mail or on a diskette (3.5, or 5.25, MS-DOS). If the file is suitable, proofs will be produced without rekeying the text. The article should be encoded in Elsevier-LaTeX, standard LaTeX, or AMS-LaTeX (in document style 'article'). The Elsevier-LaTeX package, together with instructions on how to prepare a file, is available from the Publisher. This package can also be obtained through the Elsevier WWW home page (http://www.elsevier.nl/), or using anonymous FTP from the Comprehensive TeX Archive Network (CTAN). The host-names are: ftp.dante.de, ftp.tex.ac.uk, ftp.shsu.edu; the directory is: tex-archive/macros/latex/contrib/supported/elsevier. *No changes from the accepted version are permissible, without the explicit approval by the Editor. The Publisher reserves the right to decide whether to use the author's file or not.* If the file is sent by e-mail, the name of the journal, *Discrete Applied Mathematics*, should be mentioned in the 'subject field' of the message to identify the paper. Authors should include an ASCII table (available from the Publisher) in their files to enable the detection of transmission errors.
The files should be mailed to: Log-in Department, Elsevier Science B.V., P.O. Box 2759, 1000 CT Amsterdam, Netherlands. E-mail: m.griffin@elsevier.nl.

Mathematical Software Section

The section will consider papers falling in the same areas as DAM, and will essentially publish three kinds of contributions:

1. Regular papers, processed and accepted for their mathematical novelty, for which, in addition, the authors give and describe the corresponding computer codes.
2. Papers presenting significant implementations of algorithms from the literature, provided they are of particular interest to the scientific community. Criteria for acceptance of this kind of contribution will be: high efficiency, proved through extensive computational experiments, significantly improving that of the best existing codes (one order of magnitude is considered to be significant); novelty of the software, when no other code for the same problem is available to the public domain.
3. Papers presenting comparative studies on relevant existing software.

To submit their work, authors are requested:

- to mail three hard copies of the manuscript to Nelly Segal, Editorial Manager, RUTCOR, Rutgers University, P.O. Box 5062, New Brunswick, NJ 08903-5062, U.S.A., mentioning "Mathematical Software Section" in their covering letter and
- To send the codes electronically to Professors S. Martello and P. Toth at **smartello@deis.unibo.it/ptoth@deis.unibo.it**

Only source codes are considered. Accepted languages are FORTRAN and C. The codes must strictly conform to the ANSI 77 Standard FORTRAN and to the ANSI C Standard, respectively.

The codes must be clean, well documented and self contained. Use of machine-dependent constants and functions should be avoided or, when needed, clearly stated. Each code must contain a main subroutine or procedure which receives all the input data and yields all the output data as parameters. Such a routine must begin with a comments section providing:

- clear description of the domain of applicability
- meaning of each input and/or output parameter
- list of machine dependent constants and functions
- list of the routines composing the codes
- type of structure of all the parameters
- rules for the arrays dimensioning
- meaning of the main interval variables

Indentation is recommended for loops and if-then-else statements. The labels in each routine should be consecutive with constant step. Examples of well-structured codes can be found in Martello and Toth, "Knapsack Problems: Algorithms and Computer Implementations", Wiley, 1990.

Each code must be accompanied by a driver program which:

- defines the input data for one or more sample instances through assignment or input statements (in the latter case, the contents of the input records must be explicitly listed)
- calls the main routine of the code
- prints out the results on a standard unit. (The comments section of the driver program must provide the expected output.)

The codes will be available via a library managed by Elsevier Science through a Web-server at http://www.elsevier.nl/locate/dam

Copyright in the articles is held, except where noted, by Elsevier Science. Copyright as well as other proprietary rights in the source code are held by the authors. By submitting the code along with the article, the authors have agreed to permit the readers of *Discrete Applied Mathematics* the right to use the algorithms for personal and professional research use, but not for any further redistribution, further sublicensing, or commercial use. All rights are otherwise reserved.

Subscription Information

Discrete Applied Mathematics (ISSN 0166-218X). For 2000 Volumes 98–106 are scheduled for publication. A combined subscription to Discrete Applied Mathematics and Discrete Mathematics (Vols. 210–225) at reduced rate is available.
Subscription prices are available upon request from the publisher. Subscriptions are accepted on a prepaid basis only and are entered on a calendar year basis. Issues are sent by surface mail except to the following countries where air delivery via SAL is ensured: Argentina, Australia, Brazil, Canada, Hong Kong, India, Israel, Japan, Malaysia, Mexico, New Zealand, Pakistan, PR China, Singapore, South Africa, South Korea, Taiwan, Thailand, USA. For all other countries airmail rates are available upon request.

Advertising information. Advertising orders and enquiries can be sent to: **Europe and ROW**: Rachel Gresle-Farthing, Elsevier Science Ltd., Advertising Department, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, UK; phone: (+ 44) (1865) 843565; fax: (+ 44) (1865) 843976; e-mail: r.gresle-farthing@elsevier.co.uk. **USA and Canada**: Elsevier Science Inc., Mr Tino DeCarlo, 655 Avenue of the Americas, New York, NY 10010-5107, USA; phone: (+ 1) (212) 633 3815; fax: (+ 1) (212) 633 3820; e-mail: t.decarlo@elsevier.com. **Japan**: Elsevier Science Japan KK, Advertising Department, 9-15 Higashi-Azabu 1-chome, Minato-ku, Tokyo 106, Japan; phone: (+ 81) (3) 5561-5033; fax: (+ 81) (3) 5561 5047.

Orders, claims, and product enquiries (no manuscript enquiries): please contact the Customer Support Department at the Regional Sales Office nearest to you:

New York: Elsevier Science, P.O. Box 945, New York, NY 10159-0945, USA. phone: (+ 1) 212-633-3730, [toll free number for North American customers: 1-888-4ES-INFO (437-4636)], fax: (+ 1) (212)-633-3680, e-mail: usinfo-f@elsevier.com

Amsterdam: Elsevier Science, P.O. Box 211, 1000 AE Amsterdam, The Netherlands. phone: (+ 31) 20 485 3757, fax: (+ 31) 20 485 3432, e-mail: nlinfo-f@elsevier.nl

Tokyo: Elsevier Science, 9-15, Higashi-Azabu 1-chome, Minato-ku, Tokyo 106, Japan; phone: (+ 81) (3)-5561 5033; fax: (+ 81) (3)-5561 5047, e-mail: info@elsevier.co.jp

Singapore: Elsevier Science, No. 1 Temasek Avenue, #17-01 Millenia Tower, Singapore 039192; phone: (+ 65) 434 3727; fax: (+ 65) 337 2230, e-mail: asiainfo@elsevier.com.sg

Rio de Janeiro: Elsevier Science, Rua Sete de Setembro 111/16 Andar, 20050-002 Centro, Rio de Janeiro–RJ, Brazil; phone: (+55)(21) 509 5340; fax: (+55)(21) 507 1991; e-mail: elsevier@campus.com.br [Note (Latin America): for orders, claims and help desk information, please contact the Regional Sales Office in New York as listed above]

Authors' benefits

1. 50 reprints per contribution free of charge.
2. 30% discount on all Elsevier Science books.

US mailing notice – Discrete Applied Mathematics (0166-218X) is published semi-monthly by Elsevier Science B.V., Customer Support Department, P.O. Box 211, 1000 AE Amsterdam, The Netherlands, Fax: +31 20 4853432. Annual subscription price in the USA US$ 2089.00 (US$ price valid in North, Central and South America only), including air speed delivery. Periodicals postage paid at Jamaica, NY 11431.

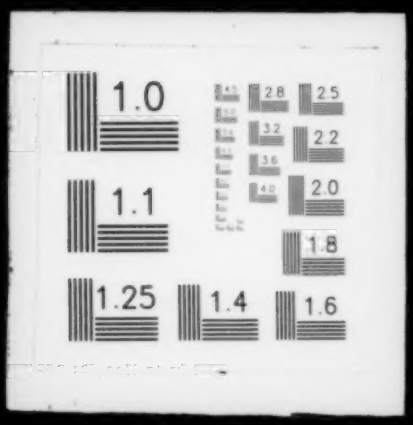
USA POSTMASTERS: Send address changes to Discrete Applied Mathematics, Publication Expediting, Inc., 200 Meacham Avenue, Elmont, NY 11003. Air freight and mailing in the USA by Publication Expediting.

CONTENTS direct

This journal is part of **ContentsDirect**, the ***free*** alerting service which sends tables of contents by e-mail for Elsevier Science books and journals. You can register for **ContentsDirect** online at: **www.elsevier.nl/locate/contentsdirect**.

0166-218X(2000)91-100;1-2

Keep track of recently published papers via the journal's home page on the WWW: http://www.elsevier.nl/locate/dam


1.0
1.1
1.25
1.4
1.6
2.8
2.5
3.2
2.2
3.6
2.0
4.0
1.8